SHARP SERVICE MANUAL

CODE: 00ZZ87/85IIISME

Z-87
MODEL Z-85III

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Parts marked with "⚠" is important for maintaining the safety of the set. Be sure to replace these parts with specified ones for maintaining the safety and performance of the set.

SHARP CORPORATION

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The contents are subject to change without notice.

[1] BASIC SPECIFICATIONS

Type:
Desktop

Copying system:
Dry-type electrostatic plain paper copier

Kinds of originals:
Sheets, book
Thickness: 30 mm (1.18 inch) maximum with the original cover in use.
Weight: 1.8 kg (3.96 lbs) maximum

Original size:
Maximum 10" x 14"

Copy size:
(Cassette feed); 250 sheet capacity
8-1/2" x 11, 8-1/2" x 14", 5-1/2" x 8-1/2" (14.9 lbs to 21.3 lbs)
Multi by-pass feed;
50 sheet capacity (56 ~ 80g/m^2 standard Sharp copy paper)
(Manual feed);
8-1/2" x 14" to 3" x 5"
exceed 105g/m^2: 8-1/2" x 11" max.

Copy speed:
10 copies/minute: 8-1/2" x 11"

First copy:
① Approx. 9 sec. (Except Auto start and Power Save mode)
② Approx. 20 sec. (In Power Save mode, 20°C, 65% RH)
③ Approx. 29 sec. (In Auto start mode, 20°C, 65% RH)

Warmup time:
Not applicable

Multicopying:
1 to 50 copies, (UP-UP key, countdown LED type, with auto repeat function)

Magnification ratio:
(Inch series) 75%, 95%, 100%, 124%

Exposure system:
Slit exposure with stationary platen and moving light source. Automatic exposure system.
Variable light source illumination.

Paper feed system:
Single cassette auto paper feed (Z-87: 250 sheets/Z-85Ⅲ: 100 sheets) and manual paper feed

Developing system:
Dry-type, two-component magnetic brush development (2-component developer)

Fusing system:
Heat roller

Light source:
Halogen lamp

Power requirements:
AC120V ±10%, 60Hz ±2%,

Power consumption:
1.15 kW maximum, 50 W/h standby (power down mode)

Physical dimensions:
Z-87: 507(W) x 440(D) x 313(H) mm
20"(W) x 17-21/64"(D) x 12-21/64"(H)
Z-85Ⅲ: 507(W) x 440(D) x 295(H) mm
20"(W) x 17-21/64"(D) x 11-5/8"(H)

Machine occupation space:
580(W) x 440(D) mm
22-27/32"(W) x 17-21/64"(D)

Operating conditions:
Temperature 10 ~ 30°C (50-86 F)
Humidity 20 ~ 85% RH

Weight:
Z-87: 21.7 kg (50.3 lbs)
Z-85Ⅲ: 20.0 kg (48.5 lbs)

Display Functions:
PRINT: The green lamp turns ON when the copier is ready for copying and right after power-on, and flashes when in the power down mode.
MULTICOPY: Multicopy number displayed on LED. Normally 0.
MISFEED: The red lamp flashes when the paper is misfed.
TONER: Indicator flashes when the toner box is empty.
DRUM: ON after 8,000 copies. Starts to flash after 9,000 copies and the machine stop.

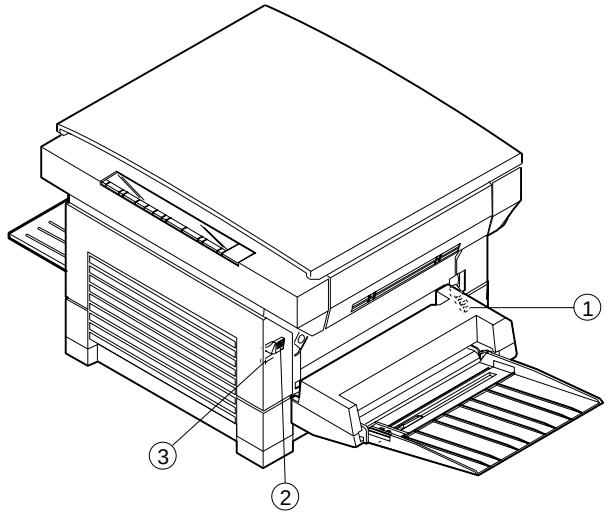
Accessories:
Drum cartridge x 1 (JAPAN, USA, CANADA)
Semi-universal cassette x 1
Instruction manual x 1
Warranty card x 1 (Australia)
Power supply cord x 1

Options:

Drum cartridge	(ZT-50DR)
TD cartridge	
Black	(ZT-50TD1)
Red	(ZT-50TD2)
Blue	(ZT-50TD3)
Brown	(ZT-50TD4)
Green	(ZT-50TD5)

The term "TD cartridge" indicates "Toner Developer" cartridge.

[2] OPERATION PANEL AND INDICATOR FUNCTIONAL DESCRIPTION



① **Power switch**
Power is turned on and off using the power switch.

② **Upper frame release button**
Used to release the frame lock when a misfeed occurs or the drum cartridge has to be replaced.

③ **Doorswitch**
Used to check the front door position.
If the front cover is opened, the misfeed and multicopy indicator will be reset.

④ **Auto exposure control**
Selects appropriate exposure rate depending on the contrast and background color of the original.

⑤ **Exposure control**
It has three set level.
For most originals, set to AUTO.
To make the copy darker, set to DARK.
To make the copy lighter, set to LIGHT.

⑥ **Misfeed indicator**
When a misfeed occurrs, this lamp turns ON.

⑦ **TD cartridge replacement indicator**
The lamp flashes when the TD cartridge needs replacement.

⑧ **Drum cartridge replacement indicator**
After 8,000 copies, the indicator will start to flash. An additional 1,000 copies can be made. After the additional 1,000 copies are made, the indicator will stop flashing and stay ON. No additional copies can be made until the Drum cartridge is replaced.

⑨ **Multicopy**
Copy numbers between 1 and 50 can be entered using the right key (units digit) and the left key (tens digit). When the left key is depressed in the middle of multicopy operation, the number of copies already made is displayed.

⑩ **Auto repeat**
Upon completion of copying in the multicopy mode, the copy number previously set returns to the copy number set display. Use of the CLEAR key resets the number. One minute after completion of copying, the number and the auto repeat functions are automatically cleared.

⑪ **Paper feed alarm (P indication)**
If a sheet of paper is not transferred to the paper stopper after depression of the PRINT key, or the cassette is empty, "P" is displayed in the copy number window. If the COPY NUMBER key or the CLEAR key is depressed or the MANUAL FEED switch is pressed, the "P" indication disappears.
When the copier is opened, the "P" indication is also cancelled.

⑫ **Clear**
Multicopy and auto repeat modes are cleared with the CLEAR key. One minute after completion of copy operation, the preset number and the repeat functions are automatically cleared and the copy exposure control returns to AUTO.

⑬ **PRINT key**
20 seconds after power is turned on, the READY lamp turns ON indicating that the copier is ready for copying. If left unoperated for 90 seconds, the copier then goes into the power save mode and the READY lamp changes from ON to flashing. When the PRINT key is pressed while the READY lamp is on, the machine immediately starts to copy. When the PRINT key is pressed while the READY lamp is flashing, the power save mode is cancelled, the original table moves to the copy start position, and it starts the copy operation after completion of the warmup cycle. The time before the copy process starts is dependent on the time in the power save mode, but it will be less than 8 seconds after the depression of the PRINT switch.

⑭ **Ratio select key**
Used to control magnification ratio, two choices for reduction, one choice for enlargement, and one choice for normal size.

[3] UNPACKING AND INSTALLATION

1. Unpacking

(1) Open the carton in the following sequence.

① Cut the tape around the top of the package and open the flaps.

② Remove the upper packing cushion and take out the machine.

✳ Save the carton and packing materials. They should be used to repack and protect the copier if it must be shipped for servicing or in case you move.

2. Installation

Installation requirements:
Please note the following requirements when installing the copier.

(1) Machine Environment

① Avoid installation in direct sunlight and near a window in direct sunlight.
Direct sunlight may cause the plastic components and the original cover to deform. Frosted glass may also produce the same effect.

② Avoid installation in a hot, damp place or where rapid changes in humidity occur (for example; near an air conditioner).
This may cause paper to dampen or moisture inside the copier, and may lead to a misfeed and deterioration in copy quality.
The recommended environmental conditions are:
20 to 25 degrees C (68 to 77 degrees F.), 65%±5%RH.
The nominal environment conditions are:
10 to 30 degrees C. (40 to 86 degrees F.), 0 to 85%RH.
If the copier is to be installed in an area of higher temperature the humidity must be lower. Example; If the temperature, is 35 degrees C. (95 degrees F), The humidity should be 65%.

③ Avoid installation in a place where dust or vibration is encountered.
Dust deposit inside of the copier may lead to a deterioration of copy quality or deterioration in machine performance.

④ Install the machine on a level surface.
The toner density and copy quality may be affected unless the machine is installed in a level condition.

⑤ Do not install the copier on an unstable or uneven surface. The copier must be placed on a level surface to permit proper functioning.

⑥ Avoid installation in a place where the ventilation or air circulation is poor.

⑦ Never install the copier near inflammable materials or in the presence of ammonia fumes.
Installation near a diazo copy machine may lead to a deterioration of copy quality or a machine malfunction.

⑧ Install the copier near the wall outlet.

(2) Space around the copier

The copier requires at least 10cm of clearance between the rear side and the wall. This space is required for proper cooling fan ventilation. Adequate working space around the machine should also be allowed for ease of operation.

(3) Power source

① The power supply line should have a capacity of more than 15A, capable of supplying more than 90% of the rated voltage at full load.

② Do not use an extension cord, or operate any other equipment from the same wall outlet.

(4) Ground connection

① Use a properly grounded (three prong) wall outlet only.

3. Installation procedure

① Remove the copier from the bag.

② Press the buttons on both sides of the copier and open the front cover.
Remove tape (A) to remove the spacer where the TD cartridge will be inserted.

NOTE: Toner/Developer (TD) cartridge is sold separately.

③ Remove tape (B) and swing the exit tray down.

NOTE: Do not place any objects under the exit tray. The exit tray is linked with the fusing rollers inside the copier. When the exit tray is opened, the proper pressure for fusing toner on the paper is applied to the fusing rollers.
If there is something under the exit tray and the exit tray is not fully opened during copying, a paper jam or improper fusing may occur.

④ Open the box containing the TD cartridge. Remove the TD cartridge from the bag and shake it horizontally four or five times.

⑤ Remove the cover from the TD cartridge.

- Save the TD cartridge cover. It should be used to seal the TD cartridge if the copier must be shipped for servicing or if the copier is to be moved. (See page 6.)

⑥ Slide the TD cartridge in until it locks in place.

⑦ Close the front cover.

⑧ Remove the mirror base fixing pin and the protective packing material from the back of the document cover.

NOTE: Be sure to remove the mirror base fixing pin before turning on the power switch. Failure to do so may cause malfunctioning.

⑨ Remove the paper cassette from the bag.

⑩ Fan the copy paper and insert into the cassette (Z-87: maximum 250 sheets/Z-85Ⅲ : maximum 100 sheets). Adjust the paper guides to the correct length and width. Ensure sure the edges of the paper are under the corner hooks.

⑪ Insert the cassette into the copier.

⑫ Plug the power cord into the copier and then into the nearest outlet.

NOTE: Be sure to insert the power cord firmly.

⑬ Turn the power on.

- Wait about two minutes for the READY indicator to light. Copying is now possible.

✳ After machine installation or for TD cartridge replacement, the time required to reach ready condition may be slightly longer (less than 2 minutes).

This is because developer has not yet passed through and the toner sensor detects the under toned state. Once the ready state is reached, the time required for the next warm up is about 20 sec as specified.

4. How to carry

① Remove the cassette and disconnect the power cord.
Fix the original cover and the front cover with tape as shown below:

② Lift the copier by holding the indents for carrying as shown below:
(Note)
- Do not carry the copier with the cassette inserted.
- Always keep the copier horizontally.
- Do not hold the extended portion (multi manual feed) in the upper side of the copier.

[Note for carrying by car]

- Remove the TD cartridge and put the cartridge into package.
- Ensure the copier is stable.
- Do not keep the copier in the car for a long time because the temperature in the car may rise too high or fluctuate quickly.
- Avoid extreme vibrations when driving.

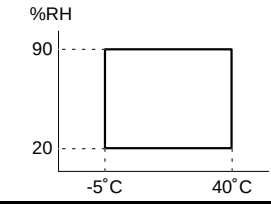
5. Note for transport and packing of the machine

When shipping the Z-87/85Ⅲ from the factory, the magnification ratio is set to x0.7 (x0.75 for inch series).
Before delivering to the customer after operation check or repairing, be sure to set the magnification ratio to x0.75 before turning off the power.
When transporting the machine, be sure to set the magnification ratio to x0.75 before turning off the power.

✳ If the power is turned off with the magnification ratio set to other than x0.75 and the machine is transported, the optical system may be damaged by vibrations and shocks.

[4] SUPPLIES

1. Drum cartridge, TD cartridge

Name	Description		Product name		* Life Approx.	Storage conditions (temperature and humidity)
Drum cartridge	Drum cartridge x 1 Instructions x 1		ZT-50DR		9,000 copies	
TD cartridge	TD cartridge x 1, (including developer and toner)		For USA	Except USA	✳	
		Black	ZT-50TD1	ZT-50DC1		
		Red	ZT-50TD2	ZT-50DC2		
		Blue	ZT-50TD3	ZT-50DC3		
		Brown	ZT-50TD4	ZT-50DC4		

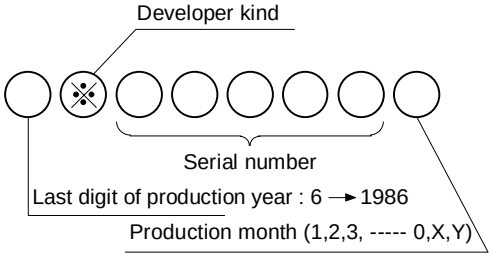
✳ 3,000 copies for black (2,700 copies for color) for A4 or 8-1/2" x 11" size paper with 5% toned area.

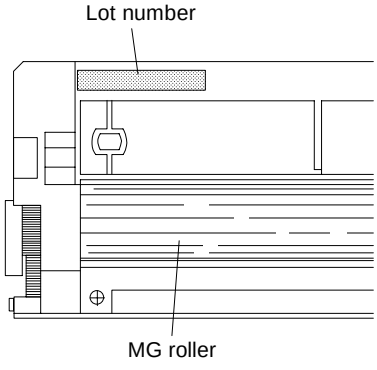
✳ These are estimates only, life will vary depending on actual use.

NOTE: How to identify the lot number

(TD cartridge)

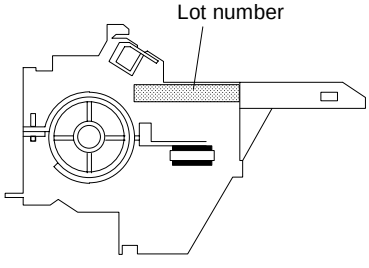
❋1. Black developer (JAPAN)
2. Black developer (EXPORT)
4. Red developer
5. Blue developer
6. Brown developer
0. No classification





(Drum cartridge)

Same as TD cartridge.



Rear frame side of the drum cartridge

2. Replacing the drum cartridge

① Turn off the power and open the front cover.

② Press down on the catch and pull out the TD cartridge slowly.

③ Press the upper frame release button to open the copier.

④ Grasp the handle of the drum cartridge and pull the drum cartridge out.

NOTE: The drum cartridge cannot be removed or inserted unless the upper frame is open.

⑤ Remove the protective cover from the new drum cartridge.

⑥ Push in the drum cartridge all the way in, then close the upper frame.

⑦ Insert the TD cartridge, then close the front cover.

⑧ Turn on the power and make sure that the DRUM replacement lamp is OFF.

3. TD cartridge replacement

For TD cartridge replacement, refer to the description in "Installation procedure."

[5] COMPONENT LOCATION

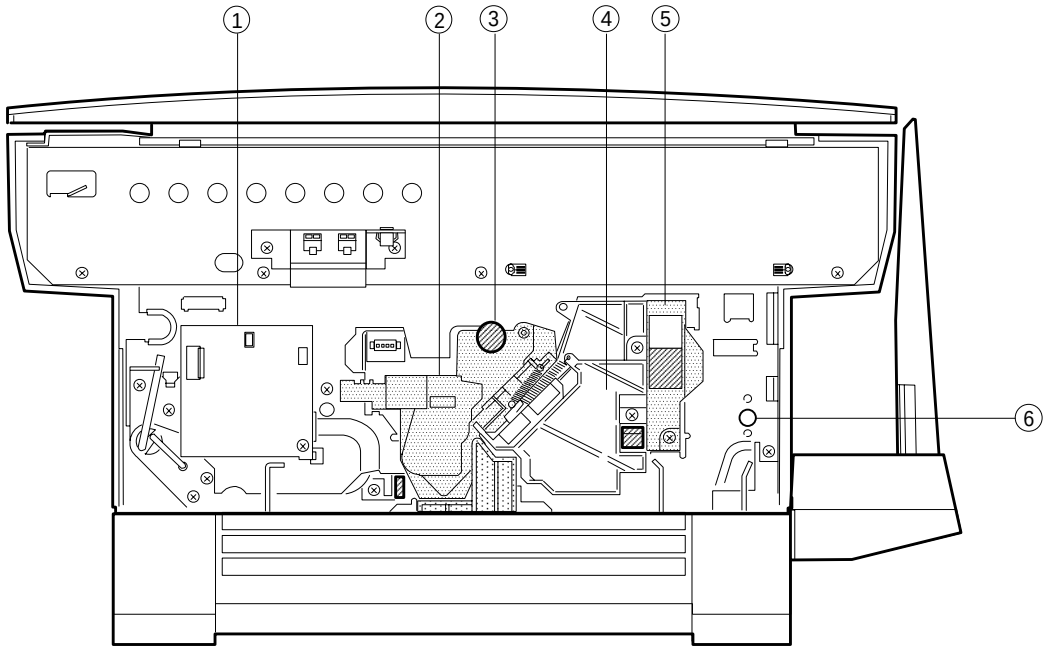
1. External

①	Exit tray	②	Original cover	③	Original table
④	Manual feed inlet	⑤	Power switch lever	⑥	Power supply cord
⑦	Indent for carrying (paper entry side)	⑧	Manual feed guide	⑨	Front cover and open buttons (both sides)
⑩	Operation panel	⑪	Cassette		

2. Open view

①	Copy exposure balance correction knob	②	Drum cartridge	③	Cleaning lever
④	TD cartridge	⑤	Upper frame release button (Appears when the front cover is shifted.)	⑥	Power cord inlet
⑦	Transfer corona unit	⑧	Fuser (High temperature)	⑨	Fuser accessing lever
⑩	Transfer corona cleaner				

3. Front frame side

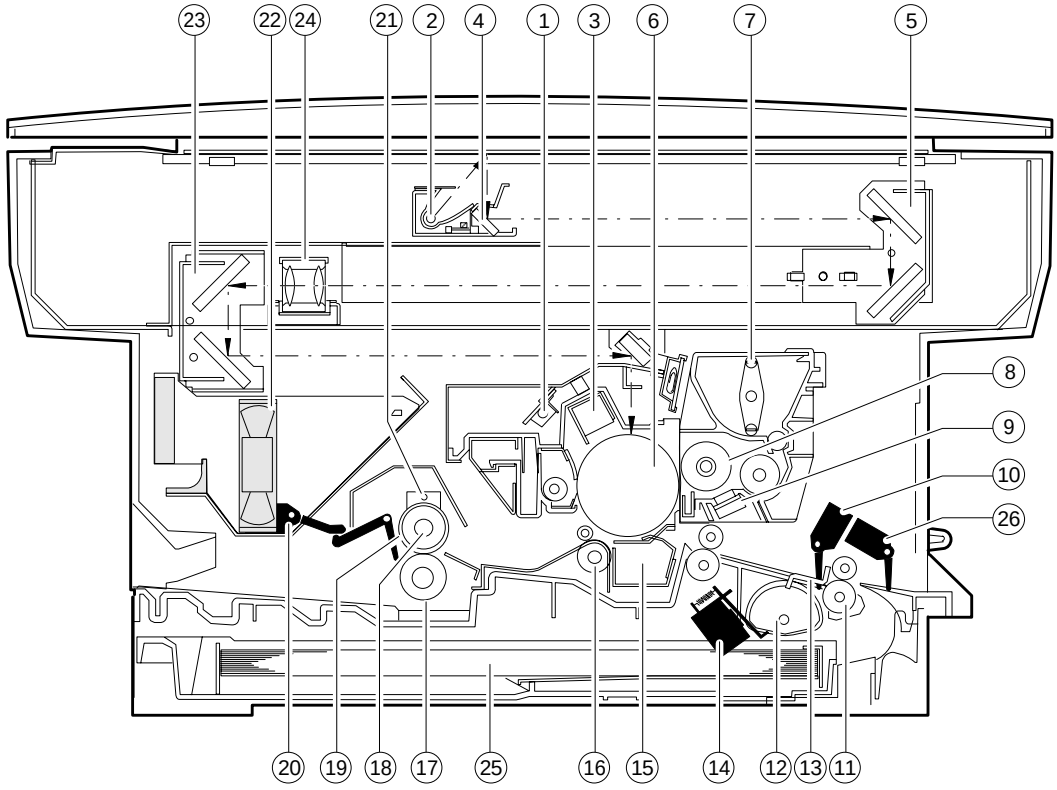


①	CLR PWB	②	Drum cartridge	③	Cleaning lever
④	Toner collection container	⑤	TD cartridge	⑥	Doorswitch (interlinked with main switch)

4. Rear frame side

①	Mirror base start position sensor (MSPS)	②	Main PWB	③	Optical system cooling fan motor
④	High voltage transformer PWB	⑤	Optical system drive motor	⑥	Main switch lever

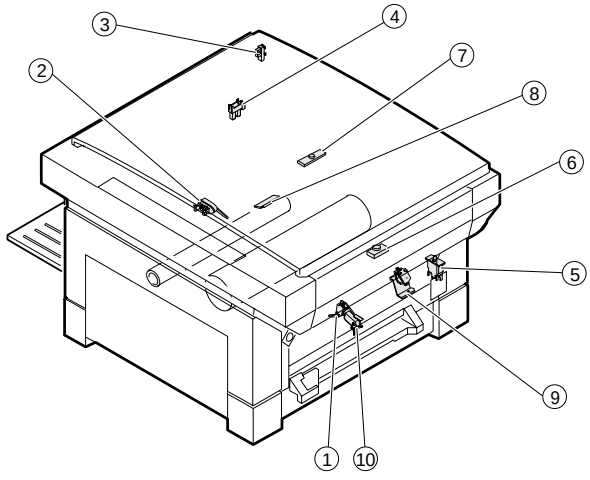
5. Cross section



①	Discharge lamp	②	Copy lamp	③	Main corona
④	No. 1 mirror	⑤	No. 2/3 mirror unit	⑥	OPC drum
⑦	TD cartridge	⑧	MG roller	⑨	Toner concentration sensor
⑩	Paper entry sensor (PPD)	⑪	Paper feed roller B	⑫	Paper feed roller A
⑬	PS plate	⑭	Cassette paper feed solenoid (PFS)	⑮	Transfer corona
⑯	Separation roller	⑰	Lower heat roller	⑱	Heater lamp
⑲	Upper heat roller	⑳	Paper exit sensor (POD)	㉑	Thermistor/thermal fuse/thermal breaker
㉒	Cooling fan (main motor driven)	㉓	No. 4/5 mirror unit	㉔	Lens
㉕	Cassette	㉖	Manual feed paper entry sensor (PID)		

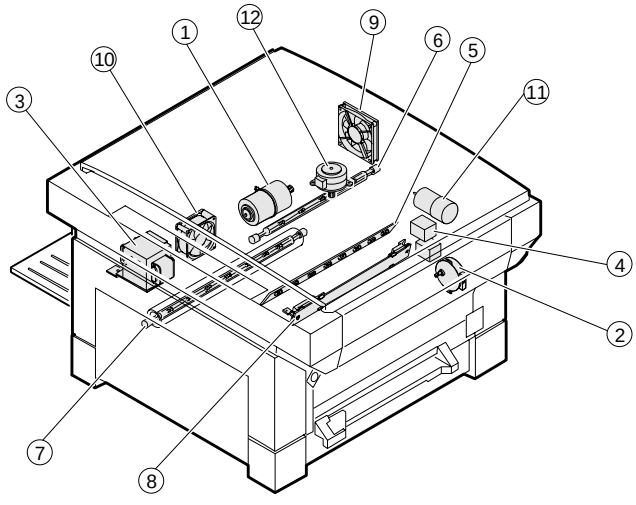
6. Switch, sensor, solenoid, spring clutch locations

	Name	Type	Function
①	PPD	Switch	Paper entry sensor
②	POD	Switch	Paper exit sensor
③	SHPS	Photosensor	Scanner home position sensor
④	LHPS	Photosensor	Lens home position sensor
⑤	MSW	Switch	Power switch
⑥	TCS		Toner concentration sensor
⑦	AE sensor	Photosensor	Original contrast sensor
⑧	Thermistor	Thermistor	Upper heat roller surface temperature sensor
⑨	PFS	Solenoid	Cassette paper feed solenoid
⑩	PID	Switch	Manual feed paper entry sensor



7. Motor, transformer, lamp locations

	Symbol	Name	Function
①	MM	Main motor	Main drive motor
②	TM	Toner motor	Toner supply motor
③	PT	Power transformer	Power transformer
④	MTHVG	Main and transfer high voltage units	Main corona and transfer corona high voltage supply units
⑤	DL	Discharge lamp	For removal of residual charge on the drum surface
⑥	CL	Copy lamp	For exposure of original
⑦	HL	Heater lamp	For heat roller heating
⑧	BL	Blank lamp	Discharges the contact (separation) section with the remover tape on the drum and non-image area in the reduction copy mode surface.
⑨	CFM.1	Optical system fan motor	Optical system cooling fan motor
⑩	CFM.2	Fusing system fan motor	Fusing system cooling fan motor
⑪	SM	Scanner motor	Drive the optical system
⑫	LM	Lens motor	Drive the lens unit



[6] COPY PROCESS

1. Basic copy process

A. Copy process

1. Charge

A uniform negative charge is applied to the opc drum surface by the main corona.

2. Exposure

Light from the copy lamp, reflected from the original, is projected onto the drum surface through the lens and mirror. The resistance of the OPC layer decreases for the area exposed by the light (corresponding to the light area of the original). The light neutralizes the negative charge. The dark areas of the original do not reflect the light and an electrostatic latent image is formed on the drum surface.

B. Copy process flow

8. Discharge

Prior to charge, light from the discharge lamp is projected over the drum to reduce electrical resistance of the OPC layer and remove any residual charge to evenly neutralize the drum surface.

C. Functional diagram

7. Cleaning

Residual toner on the drum surface is collected by the cleaning blade.

3. Developing

The electrostatic latent image in the drum surface is converted into a visible image by the toner.

4. Transfer

The visible image on the drum surface is transferred onto the copy paper by applying a negative charge from the transfer corona to the back of the copy paper.

5. Separation

The paper is separated from the drum by the remover tape and the separation roller.

6. Fusing

Through a combination of heat and pressure, the image is fused into the copy paper.

2. Image forming process steps

Image forming:
A charge is applied to the drum surface by the main corona, and the image of the original is exposed by the copy lamp. The charge in a light exposed image area is dissipated according to the degree of light intensity.Toner is attracted to the charge areas on the drum and the toner forms a visible image on the drum surface.

Step-1: Optical discharge
Residual charge on the drum surface is removed.

Step-2: Charge
Even negative charge is given to the drum surface.

Step-3: Exposure
Latent image is formed on the drum.

Step-4: Developing
Latent image formed on the drum is then developed into a visible image with toner.

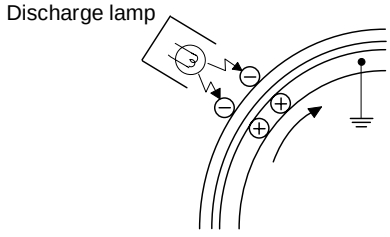
Step-5: Transfer
The visible image (toner image) on the drum is transferred onto the copy paper.

Step-6: Cleaning
Residual toner on the drum surface is collected by the cleaning blade.

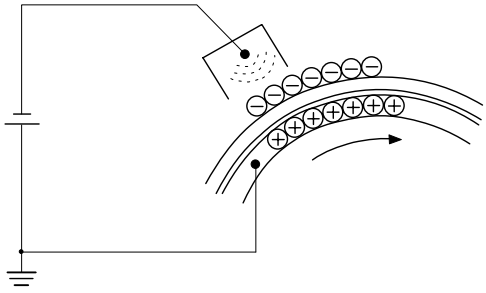
Step-7: Optical discharge
Residual charge on the drum surface is removed.

3. Description of process

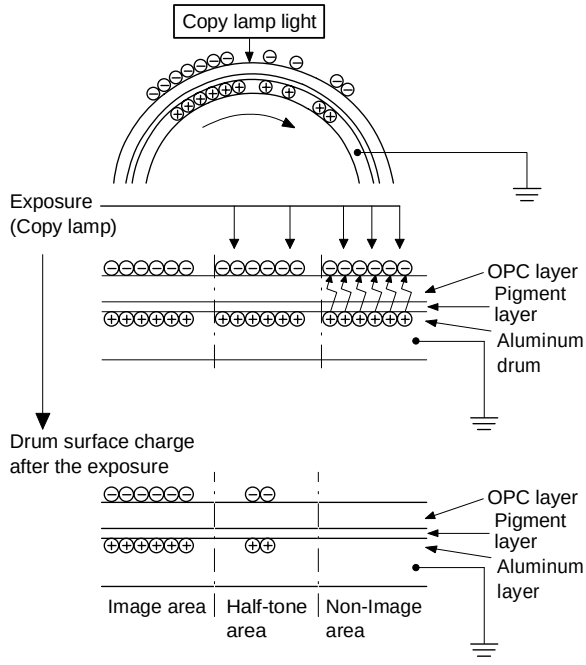
Step-1: Optical discharge (by the discharge lamp)
Prior to charge, light from the discharge lamp is projected over the drum to reduce electrical resistance of the OPC layer and remove any residual charge to evenly neutralize the drum surface. As the electrical resistance is decreased, the positive charge in the aluminium layer moves to neutralize the negative charge present in the OPC layer.



Step-2: Charge
A uniform negative charge is applied over the OPC drum surface by the main corona unit.

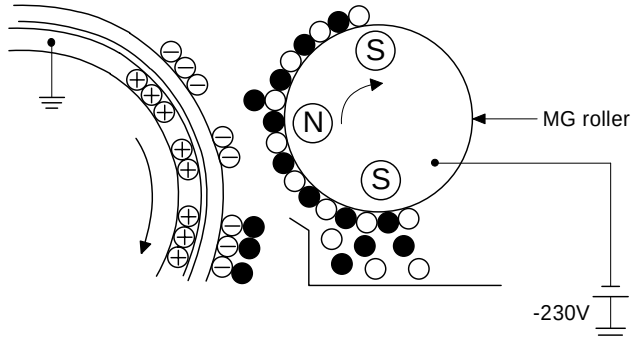


Step-3: Exposure (Copy lamp, mirror, lens)
The original image is projected through the mirror and the lens to the OPC drum by the copy lamp.
In the area where light is projected (light section of the original), the resistance in the OPC layer reduces to discharge negative charges, resulting in an electrostatic latent image on the drum surface.



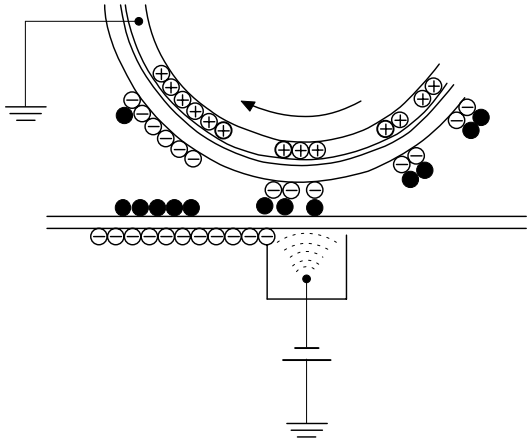
Step-4: Developing (–210V DC bias)
The electrostatic latent image in the drum surface is converted into a visible image by the toner. A bias potential of –210V is applied to the carrier (MG roller) in this two component magnetic brush developing method, and the toner is charged positive through friction with the carrier.

○ : Carrier (magnetized particle)
● : Toner (charge positive by friction)
(N) (S) : Permanent magnet
(provided in five locations)

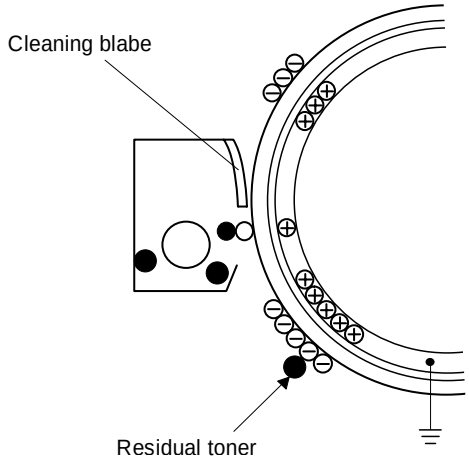


Toner is not attracted to the non-image areas on the drum because of the developing bias. Thus, if the developing bias were to fail, the residual charge would attract the toner so that a background would appear in the non-image areas of the copy.

Step-5: Transfer
The visible image on the drum surface is transferred onto the copy paper by applying a negative charge from the transfer corona to the back of the copy paper.
As the transfer effect is 70 to 80%, 20 to 30% of the image remains on the drum (residual toner) even after the transfer.



Step-6: Cleaning
Toner remaining on the drum is collected by the cleaner blade and stored in the toner collecting container.

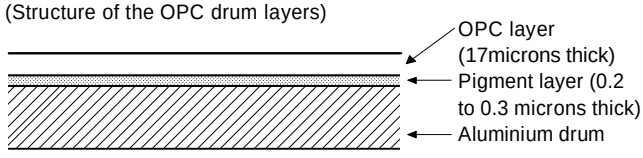


Step-7: Discharge
(same as Step-1)

Step-8: The transferred image is fixed permanently on the copy paper by the action of the fuser unit through a combination of heat and pressure, the toner is fused into the copy paper.

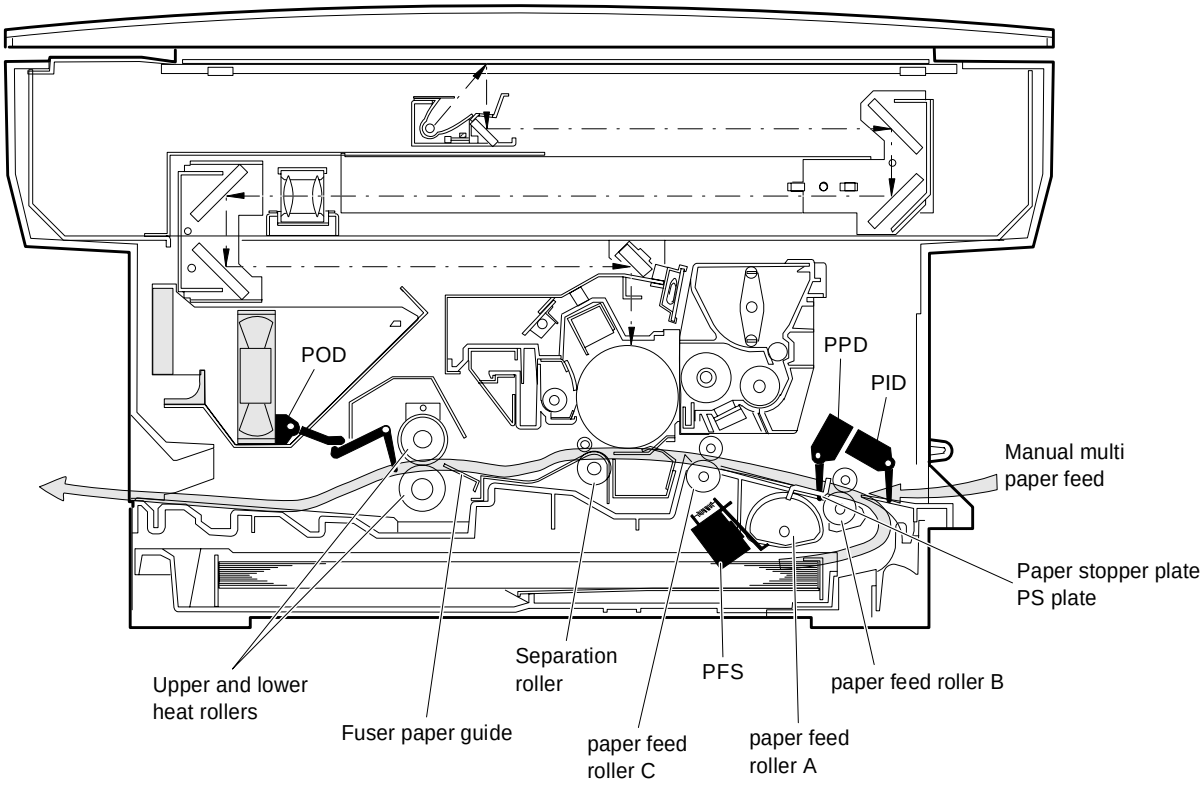
4. Photoconductor

An OPC drum is used for the photoconductor.
(Structure of the OPC drum layers)



[7] PAPER FEED AND TRANSPORT SECTION

1. Paper transport route and operational description



General Description:

Copy paper is introduced into the copier in one of two ways, from the supply of paper in the cassette or manually through the by-pass. The cassette holds approximately 100 sheets of copy paper.

The cassette supplied with the copier may be loaded with either 8-1/2" x 11" (A4) or 8-1/2" x 14" or 5-1/2" x 8-1/2" (A5) copy paper. The Separator Tabs in the cassette ensure that only one sheet is fed at a time.

The copy paper is fed out from the cassette by the Paper feed roller A. This roller make one rotation for each sheet of paper. The rotation of the feed roller is controlled by the Paper feed clutch (a spring clutch) and Paper feed solenoid. When the Print button is depressed, the Main PWB energizes the Paper feed solenoid (PFS). When the solenoid arm retracts, it releases the spring clutch and allows the Paper feed roller A to make one(1) rotation. The rotating Paper Feed Roller picks up the top sheet of copy paper and starts the paper moving into the copier.

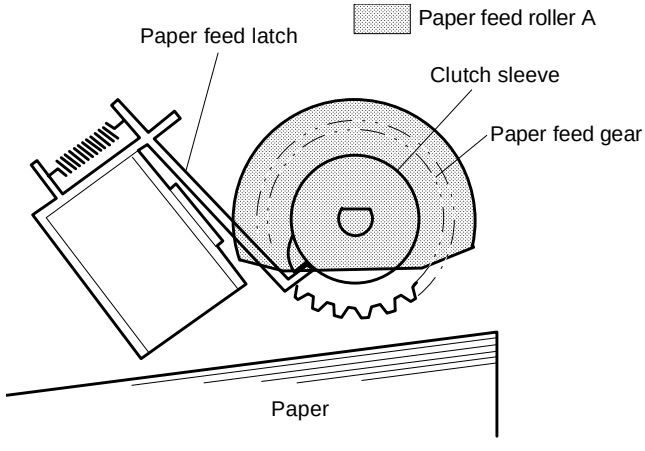
The copy paper is transported to paper feed roller B and trips the paper entry sensor POD. Paper feed roller B continues to rotate until the lead edge of the copy paper contacts the paper stopper plate. the PS sensor block (located on the original table) lifts the paper stopper plate and allows the copy paper to continue through the paper guide to paper feed roller C. The copy paper passes between the transfer corona and the drum and the image is transferred to the copy paper. The remover tape strips the copy paper from the drum and the separation roller transports it to the fuser rollers. The fuser rollers transport the copy paper, actuating the exit sensor PPD, to the exit tray.

During manual feed the inserted paper actuates the manual feed paper entry sensor PID and the main motor turns ON. The paper is then transported by paper feed roller B until the lead edge contacts the PS plate. The rest of the paper transport operation is the same as described for the cassette feed. There is no need to push the print switch during the manual feed operation.

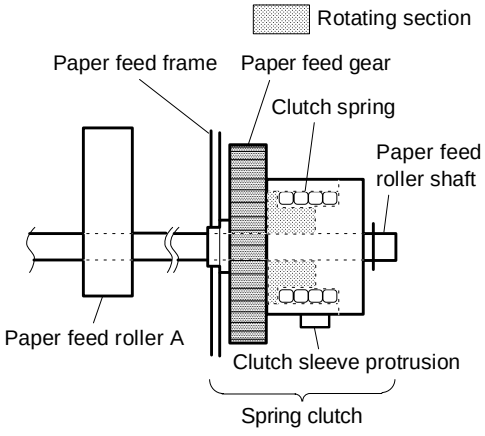
The following discusses the cassette feed and manual feed operations.

A. Operation during cassette feed

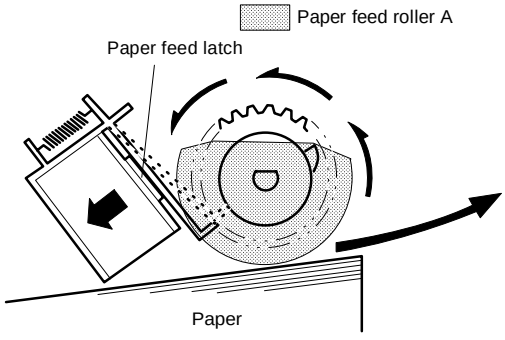
① The illustration below shows the relationship between paper feed roller A, paper feed clutch sleeve, and the paper feed latch locations when the copier is at an initial state before the PRINT key is pressed and after the READY lamp is ON.
(The paper feed latch is in contact with the clutch sleeve protrusion.)

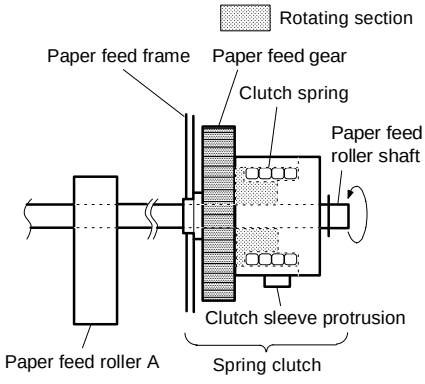


② At the moment the PRINT key is pressed, the main motor starts to turn the drive gears. The paper feed gear also starts to be driven, but the rotation of the gear is not conveyed to the paper feed roller shaft and the paper feed roller does not rotate because the paper feed latch is holding the clutch sleeve protrusion.



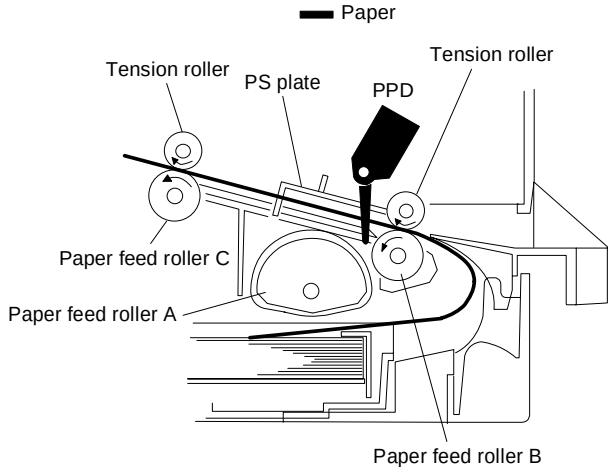
③ 0.9 seconds after the start of the main motor, the paper feed solenoid (PFS) actuates momentarily so that the paper feed latch disengages from the clutch sleeve protrusion. Now, the rotation of the paper feed gear is conveyed to the paper feed roller shaft so that paper feed roller A starts rotating to feed the paper.





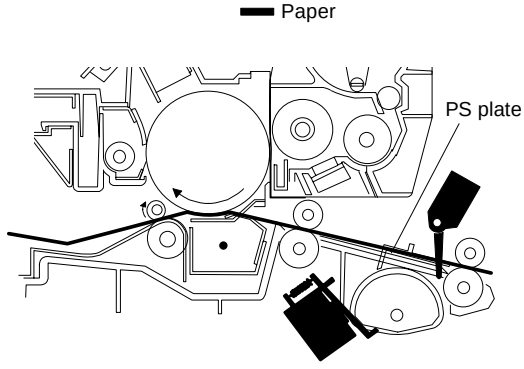
④ After paper feed roller A makes one full turn, the clutch sleeve protrusion is again caught by the paper feed latch so that paper feed roller A stops rotating.

⑤ Meanwhile, the paper fed into the machine is transported to paper feed roller B and the paper entry sensor (PPD). There, the paper is held temporarily by means of the PS plate, in order to synchronize with the lead edge of the image on the drum. Since paper feed roller B is continues to rotate, the paper will be evenly pressed against the PS plate to correct for any paper feed skew.



⑥ The PS plate is mechanically released by the PS sensing block.

⑦ After the PS plate has been released, the paper is transferred to the transfer unit via paper feed roller C. The paper is separated from the drum by the remover tape and the separation roller.



⑧ The paper separated from the drum is transported to the exit tray through the fuser paper guide, fuser heat roller, and the paper exit sensor (POD)

The following shows the timing chart for the above operation.

B. Operation during manual feed

① When paper is inserted in the manual paper feed tray, PID is actuated and the main motor starts to turn the drive gears.
The paper inserted is then taken up by paper feed roller B and is transported until its lead edge comes in contact with the PS plate. The rest of the copy paper operation is identical to the cassette feed operation described in: (A-⑤ ~ ⑧)

The following shows the timing chart for the above operation

C. Condition to establish a paper misfeed

① At power on
If PPD or POD is on at power on.

② Manual paper feed
If the PPD were to fail to actuate within 3 seconds after the actuation of the MPFS.

③ In the course of copying

a. If the paper lead edge does not actuate POD within 2.3 seconds from the first releas of PS plate after the table started to advance.

b. If POD is still actuated in 1.4 seconds after the discharge lamp turned off at the last copy in the single copy or multicopy mode.

c. If PPD is not actuated shortly after the PFS turns on, during cassette paper feed.

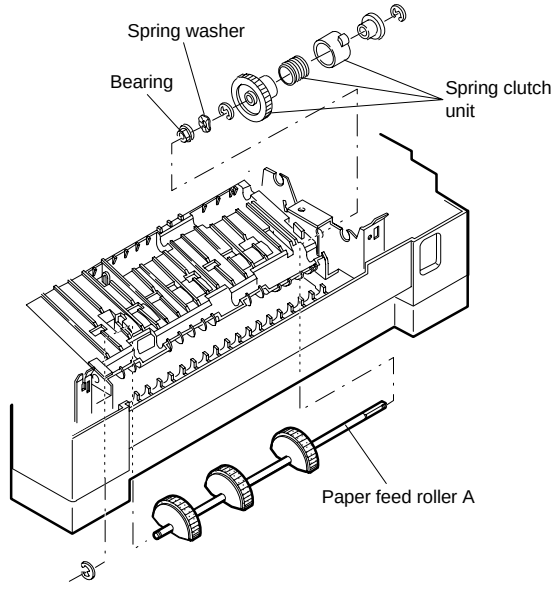
2. Major component removal

A. Paper feed rollers, A, B, C

① Remove the transfer corona unit from the paper feed section. (Refer to [10]-3.)

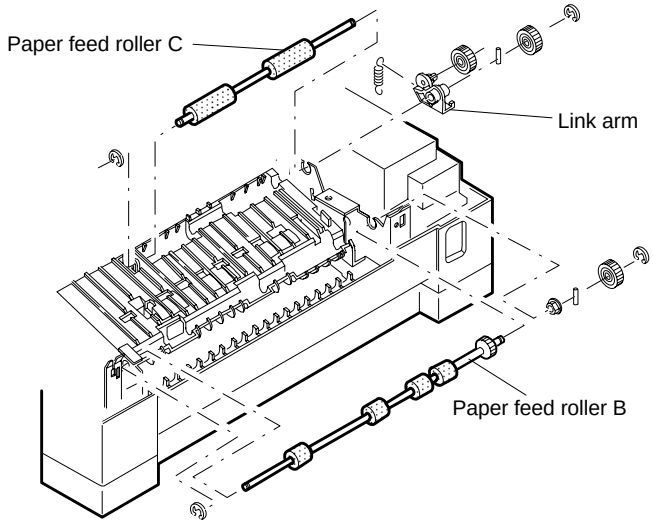
∗ This is to prevent the corona wire from being cut during operation.

② Remove the E-ring, the spring clutch unit, and the bearing, and remove paper feed roller A.
(When assembling paper feed roller A, adjustments must be performed referring to [7]-3A.)



③ Remove the E-ring, the gear, the pin and the bearing, and remove paper feed roller B.

④ Remove the E-ring, the gear, the pin, the link arm, and the bearing, and remove paper feed roller C.

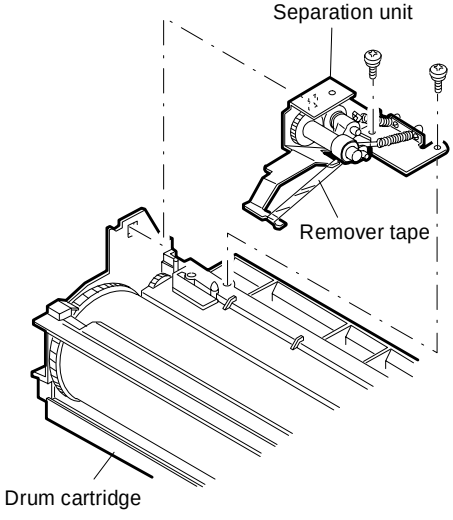


B. Remover tape

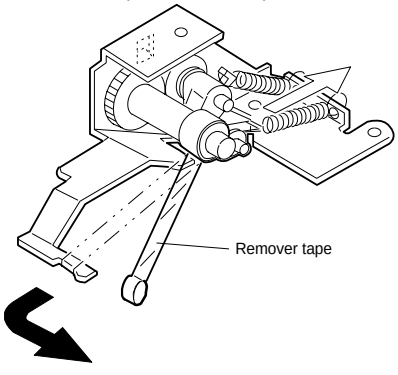
① Open the upper frame, then remove the TD cartridge and the drum cartridge.

② Remove the separation unit from the drum cartridge.

CAUTION: Do not expose the drum cartridge to direct sunlight.



③ Remove the remover tape from the separation unit.

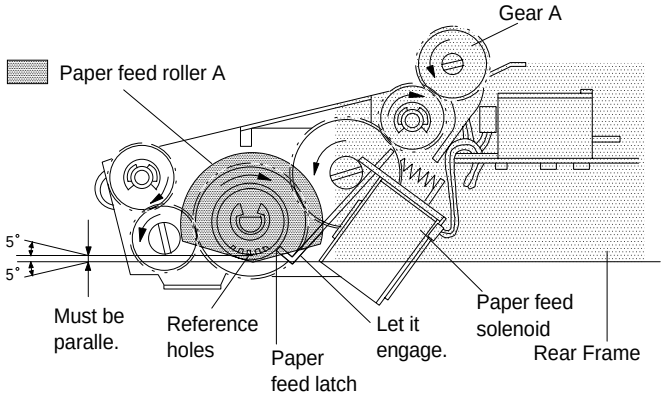


3. Adjustments

A. Paper feed roller A location (angle)

(Check procedure)

① Turn gear in the arrow direction until the clutch sleeve protrusion comes into contact with the paper feed latch.
Make sure that the lower side of paper feed roller A is parallel to the lower side of the paper feed frame. The tolerance is 0±5°.

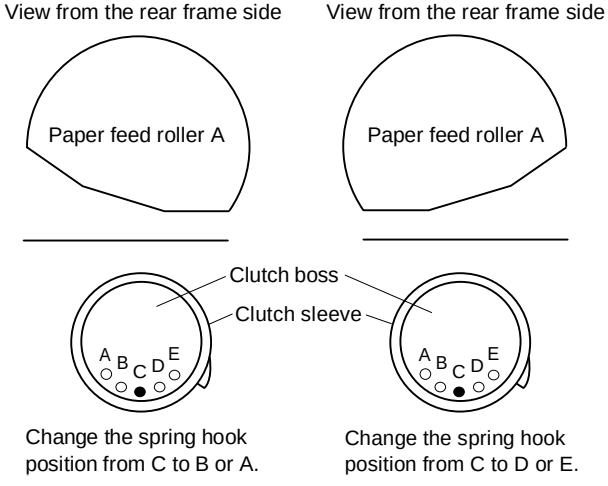


(View of the paper feed unit from the rear frame side)

(Adjustment procedure)

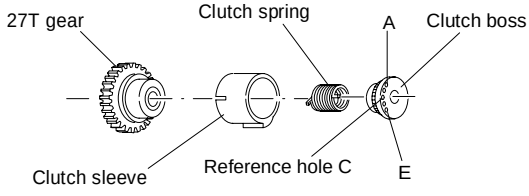
① Check the angle of paper feed roller A.

② Change the hook position of the clutch spring according to the degree of angular deviation.


View from the rear frame side
View from the rear frame side
Paper feed roller A
Paper feed roller A
Clutch boss
Clutch sleeve
A B C D E
A B C D E
Change the spring hook position from C to B or A.
Change the spring hook position from C to D or E.

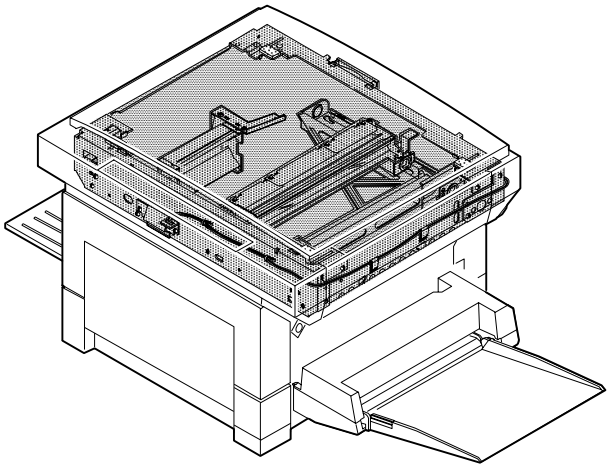
③ Remove the spring clutch assy ([7]-2-A).

④ Disassemble the spring clutch assy and change the hook position of the spring.



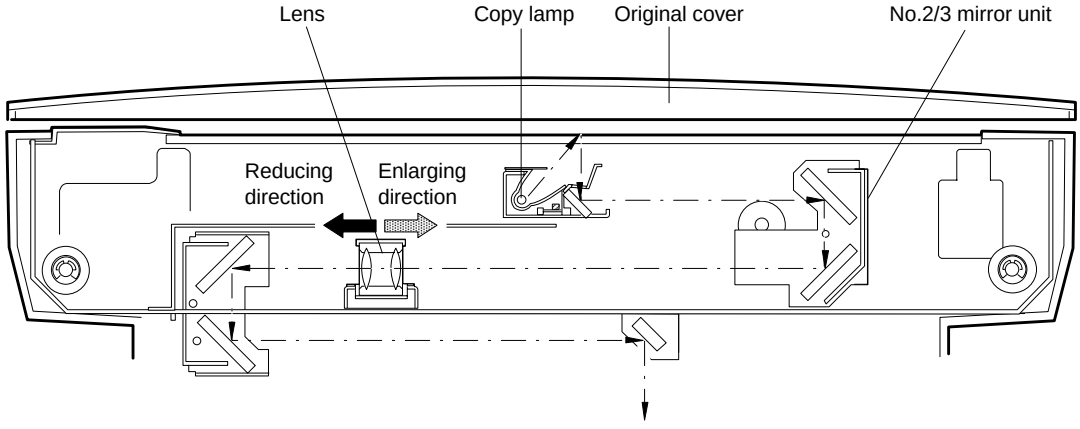
✳ When reassembling the clutch, lube the clutch spring with grease (UKOG-0062FCZZ).

[8] OPTICAL SYSTEM



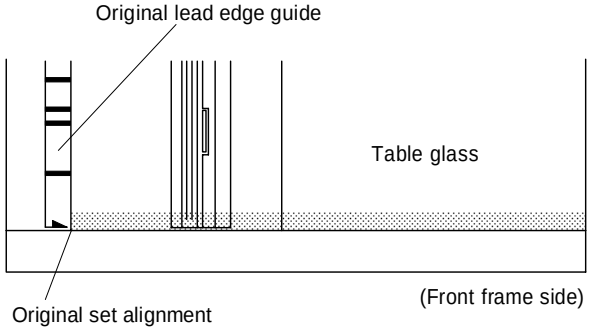
1. General description

- As a fixed focus lens is used in the optical unit, magnification ratio can be varied by changing the lens position and the optical path distance by moving the positions of the mirror-4 and mirror-5. There are choices of four magnification ratios which can be attained by selecting the magnification ratio; enlargement (x1.24), normal (x1.00) and reduction (x0.95, x0.75).
- Exposure is controlled by varying the copy lamp drive voltage. An automatic exposure sensor (photo-diode) is adopted in the optical system. Contrast of the original is determined by the automatic exposure sensor which receives the copy lamp light reflected from the original and the copy lamp intensity is controlled according to the contrast of the original thus detected.



A. Original alignment

The original must be set in alignment to the front left corner of the original table. An image loss appears in the shadowed area because of paper separation.



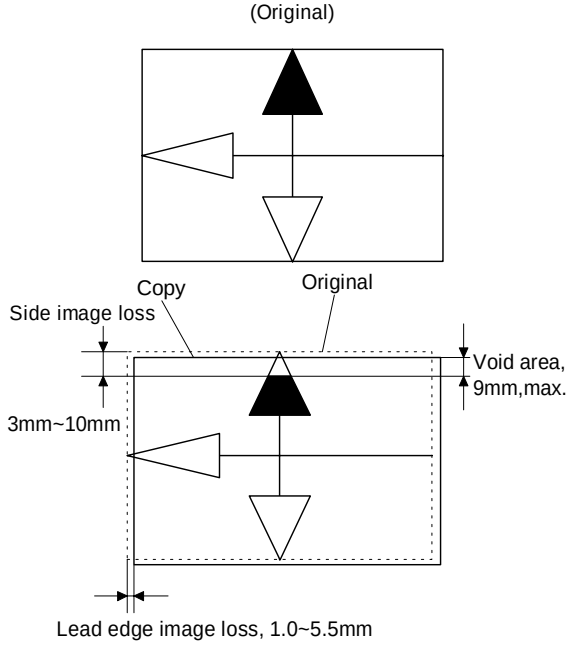
B. Void area and image loss

① Void area
Make a copy with the original cover left open. The area of the paper copied white is the void area.

② Image loss
Indicates the area of image lost on the copy.

③ Void area and image loss limits

Void area	Lead edge	0mm
	Side	9 mm, max.
Image loss	Lead edge	1 ~ 7.0 mm
	Side	3 ~ 10 mm



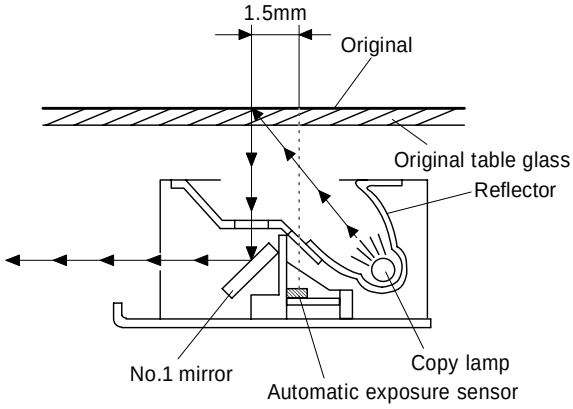
C. Light source unit

1) Copy lamp

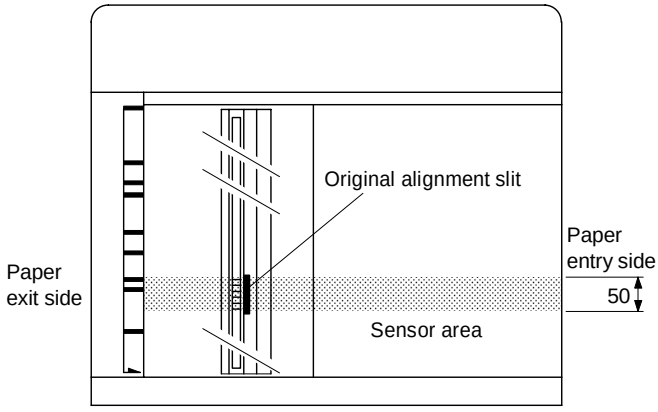
235W for the 100 V series machine

2) Automatic exposure sensor (AE)

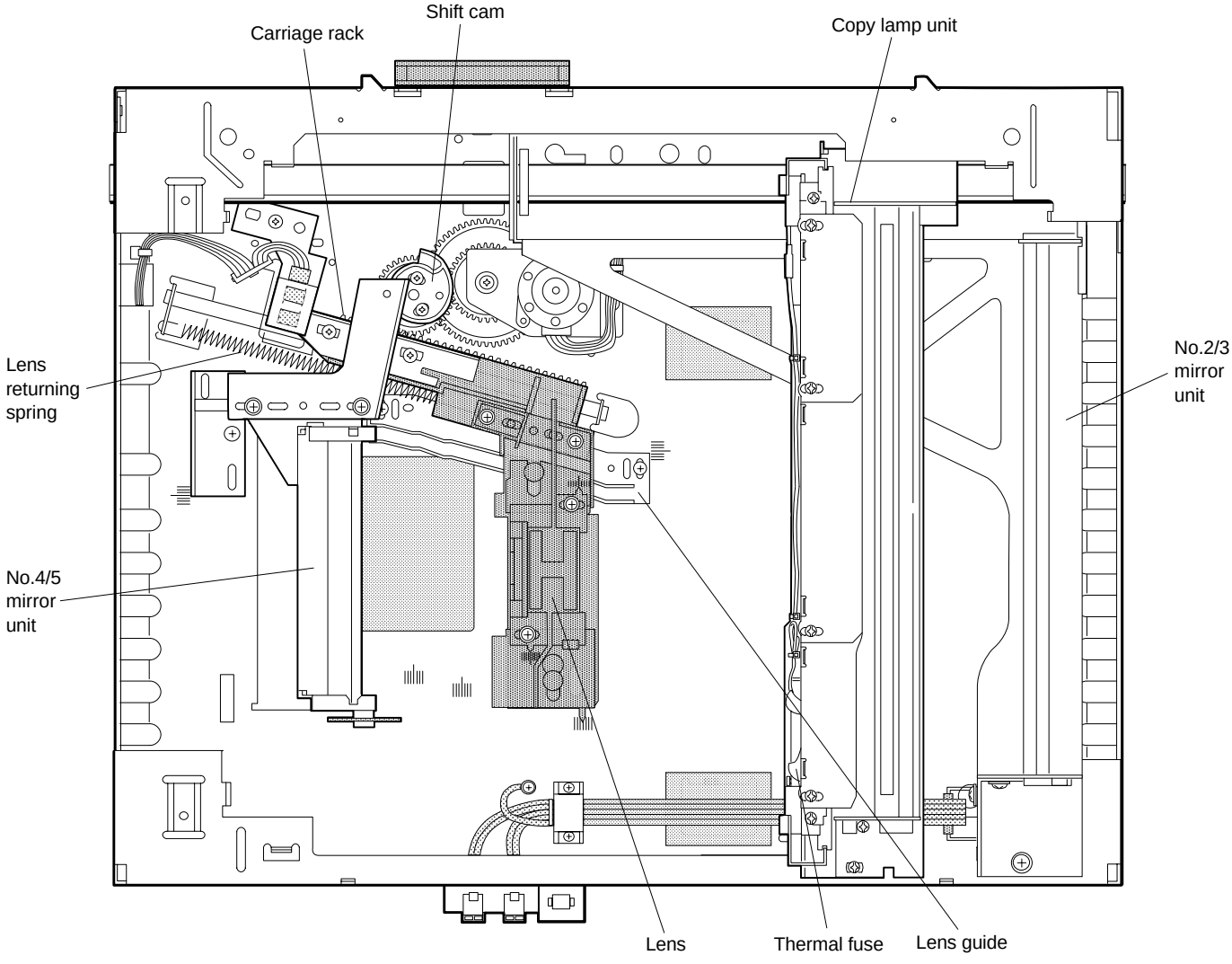
Copy lamp light reflected from the original is sensed by the automatic exposure sensor, which is sent to the CLR PWB to control the copy lamp intensity.



As the sensor is installed in the center of the 50 mm slit, the contrast of the original is sensed within this 50 mm area. (See the shadowed area in the figure below.)
For the original out of this area, the automatic exposure control function will not apply.



C. Lens unit



1) Mirrors (No.4/No.5) mirror unit

This unit is employed to control the optical distance by means of the cam.

2) Lens

A through type fixed focus lens is used.

3) Blank lamp PWB

The blank lamp PWB consists of the side lamps (SL1, 2, 3, 4) and the void lamp (VL).
In the reduce mode, light from the side lamp is exposed to the drum to prevent toner from applied on the non-image area.
Light from the void lamp is exposed over the remover contact area on the drum to discharge the area to prevent toner from applied on the void area.

Magnification ratio	SL1	SL2	SL3	SL4
0.95	OFF	OFF	OFF	OFF
0.75	ON	ON	ON	OFF

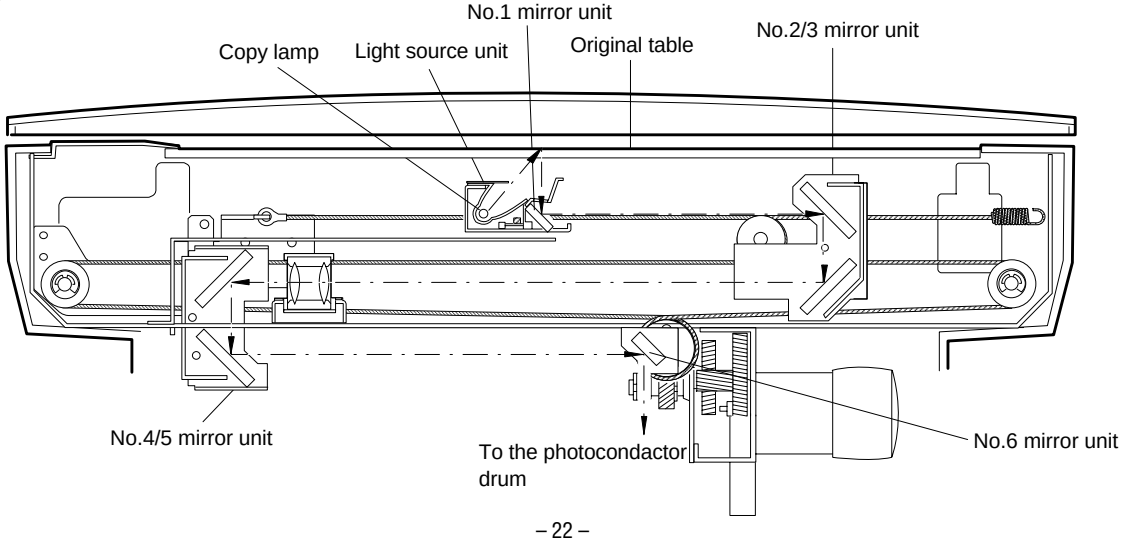
2. Optical system drive

A. Drive operation in the optical system

In the optical system, the light source unit and the No. 2 and the No. 3 mirror unit are driven by the scanner motor with the wire provided in the rear frame side according to the speed corresponding to each magnification ratio.
To move the lens unit and the No. 4 and No. 5 mirror unit, the stepping motor is used.

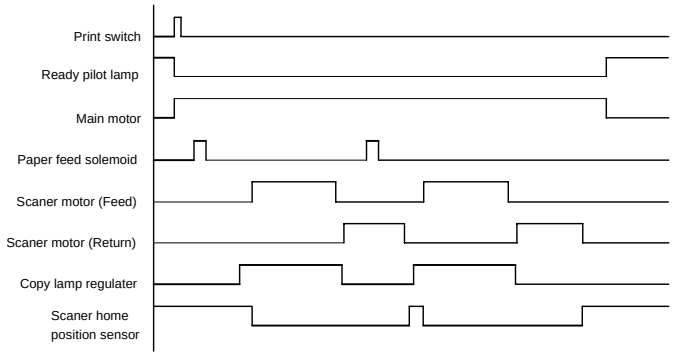
Th lens and mirrors (No. 4 and No. 5) are moved and stopped at positions corresponding to maginifcation ratios by the mechanism composed of the carriage rack and the magnification ratio shift cam.

(Drive section)



3. Optical system operation

A. Time chart (single copy from cassette)



B. Timing chart explanation

① When the PRINT switch is pressed, the main motor rotates to rotate the drive gears. After 0.9 sec, the paper feed solenoid (PFS) turns on to start paper feed.

② After 1.6 sec from starting paper feed, the copy lamp regulator (CLR) turns on. Then after 0.12 sec, the scanner motor is rotates and simultaneously the mirror start position sensor (SHPS) turns off to start mirror feed.

③ After completion of mirror feed, the scanner motor is rotates and simultaneously the copy lamp regulator (CLR) turns off to start mirror return.

④ During mirror return, when the mirror start position sensor (MSPS) turns on, the scanner motor turns off to stop mirror start position.

4. Major parts removal

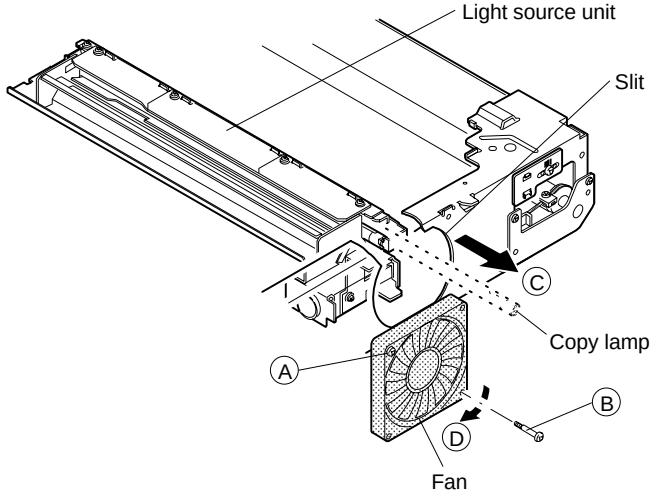
A. Copy lamp

① Remove the rear cabinet, and remove the original glass.

② Manually move the light source unit to the slit.

③ Remove screw Ⓑ, loosen screw Ⓐ, and shift the fan in the direction of arrow Ⓓ.

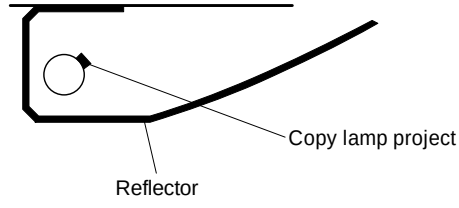
④ Hold the copy lamp and remove it from the electrode in the rear frame side of the copy lamp. Then remove the copy lamp in the arrow direction Ⓒ.



Note: Since changing the mounting position of the exposure control plate changes exposure balance, be sure to check and adjust exposure balance. (Ref. to [8]-5-A)

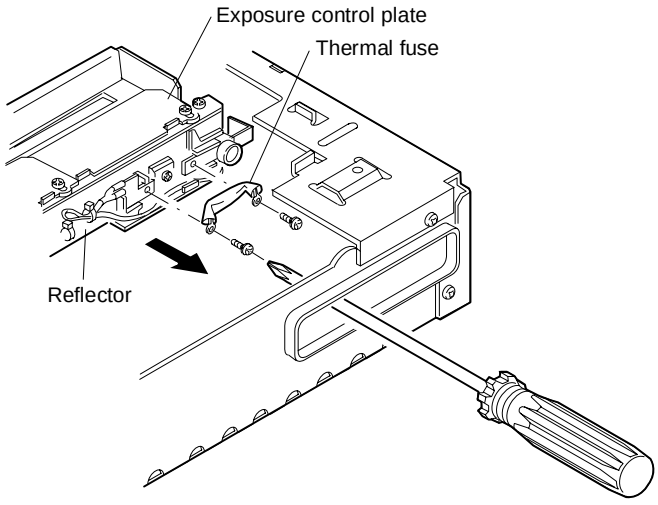
(Note for installation)

a. Copy lamp
Install the copy lamp so that the projection of the copy lamp faces outside of the reflector. (The right and left sides are interchangeable.)

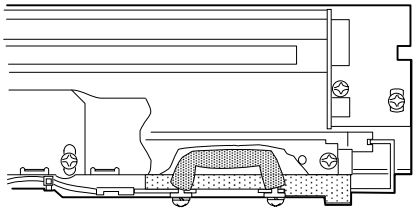


B. Thermal fuse

Install the thermal fuse so that it is in contact with the reflector.



(Enlarged view)

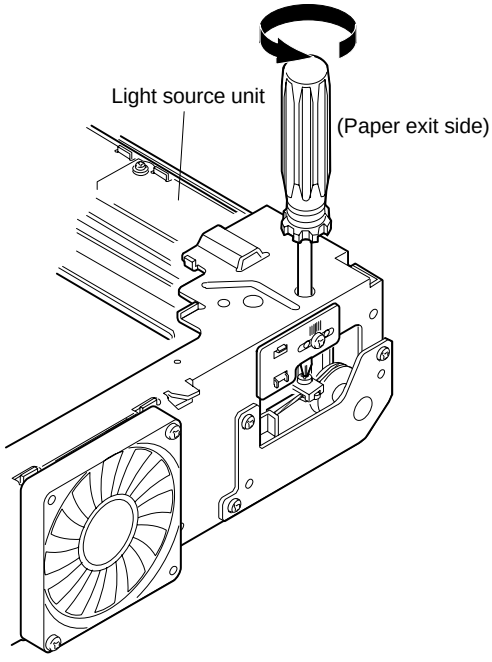


C. Light source unit

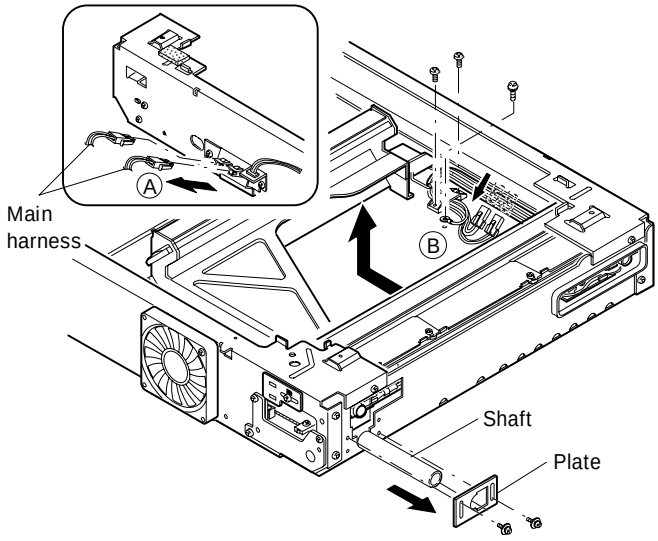
① Remove the original cover, the table glass, and the original guide L.

② Remove the rear cabinet. (Refer to [10]-1. Cabinet removal.)

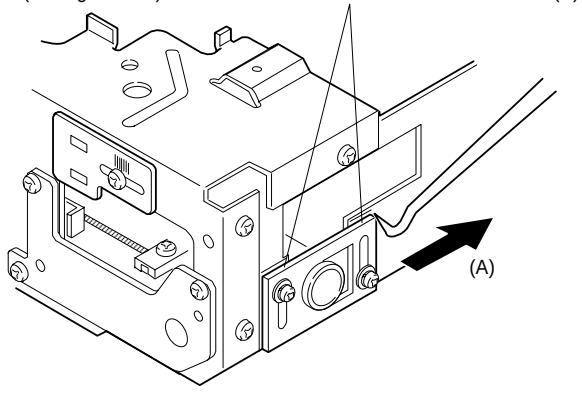
③ Shift the light source unit completely to the left (paper exit side), loosen the mirror base drive wire fixing plate mounting screw, and remove the wire from the copy lamp unit.



④ Remove the shaft and the plate. (Scribe plate position before removing to mark position) Refer to enlarged view.



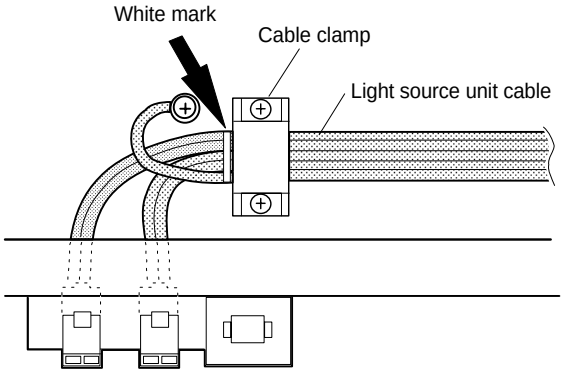
(Enlarged view) Scribe lines in the direction of arrow (A)



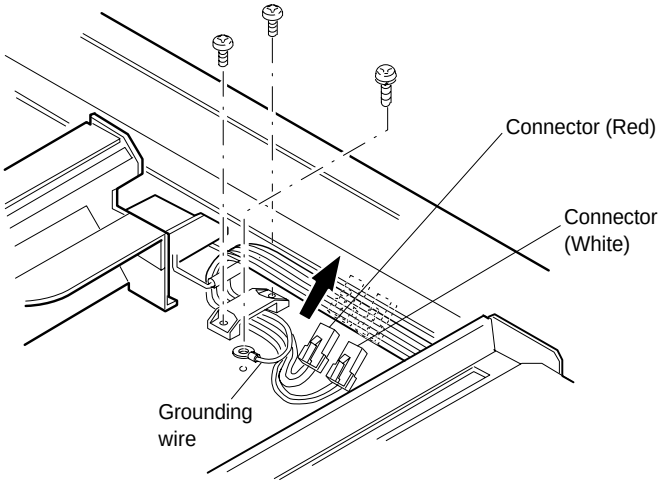
Remove two connectors Ⓐ which connect the main harness and the light source unit cable. Remove two connectors Ⓑ of the light source unit cable, remove the cable clamp, and remove the screw securing the grounding wire.

(Note for reassembly)

- When fixing the light source unit cable with the cable clamp, refer to the white mark.



- When connecting the connector of the light source unit cable, be careful not to mistake the color identification. Be sure to attach the grounding wire.

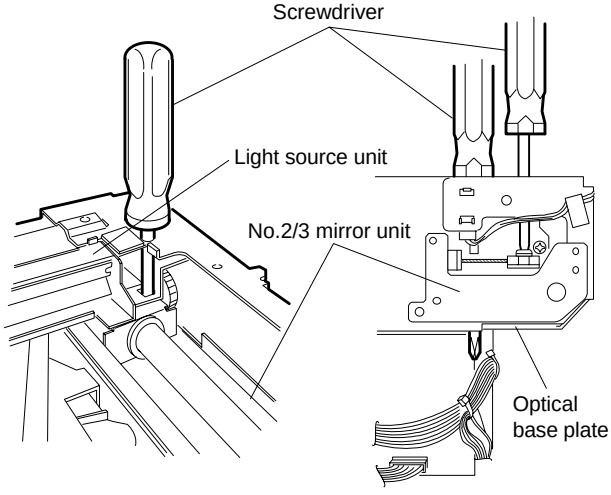


(Installation)

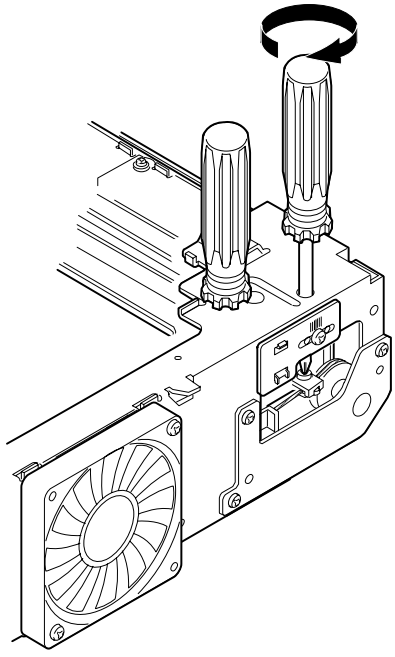
(1) Install the shaft and the plate, and install the light source unit.

(2) Shift the light source unit and the No. 2/3 mirror unit completely to the left (paper exit side).

(3) As shown in the figure below, insert a screwdriver to align the light source unit, the No. 2/3 mirror unit, and the optical base plate.



(4) Under the above state, install the mirror base drive wire fixing plate to the light source unit and fix the wire.



D. Lens removal

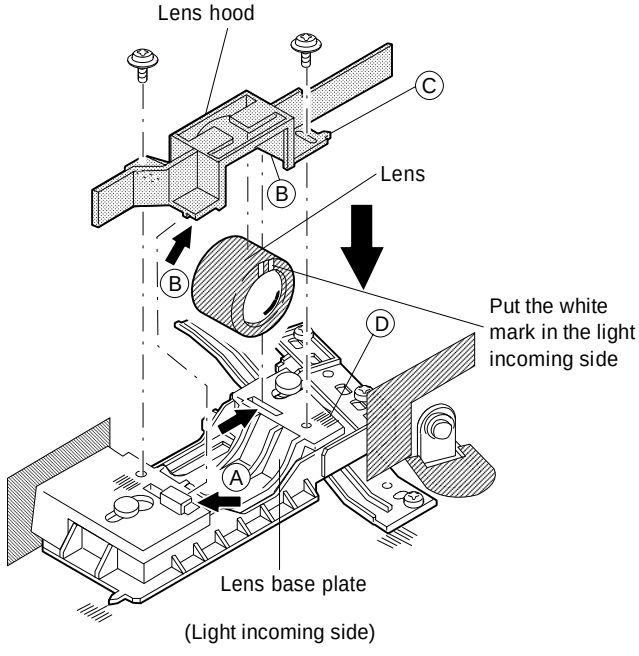
① Remove the original cover.

② Remove the original guide L and the table glass.

③ Remove the dark box.

④ As shown in the figure below, remove two screws and remove the lens hood.

⑤ Remove the lens.



(Note for reassembly)

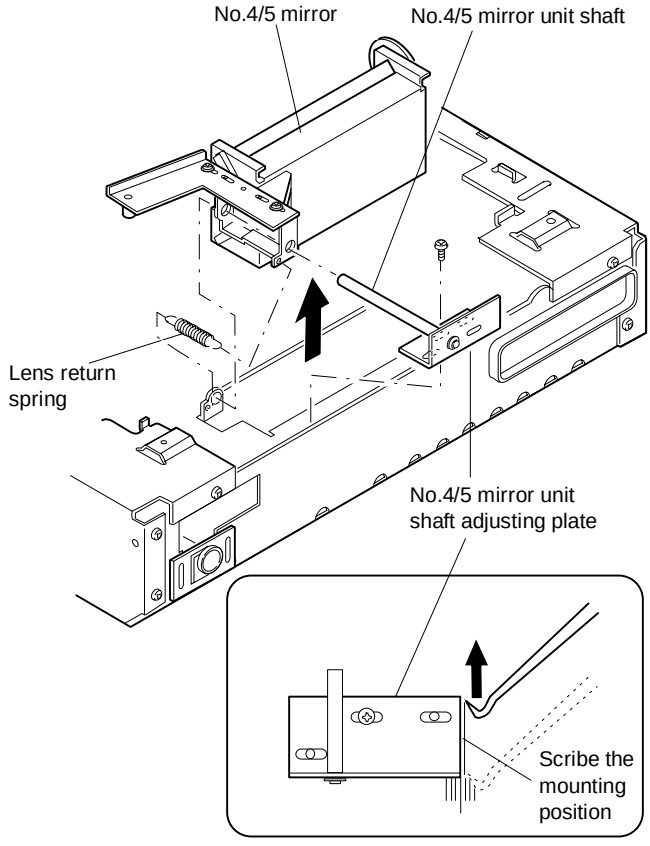
- As shown in the above figure, sections Ⓑ must be securely engaged in square holes Ⓐ.
- Fix the lens hood with two screws so that the mark on the lens hood Ⓒ comes to the center of the lens base plate indication Ⓓ.

E. The No.4/5 mirror unit removal

① Remove the table glass, left panel, and the operation panel.

② Draw a line to the location where the No.4/5 mirror unit shaft adjusting plate is, for a referance when replacing.

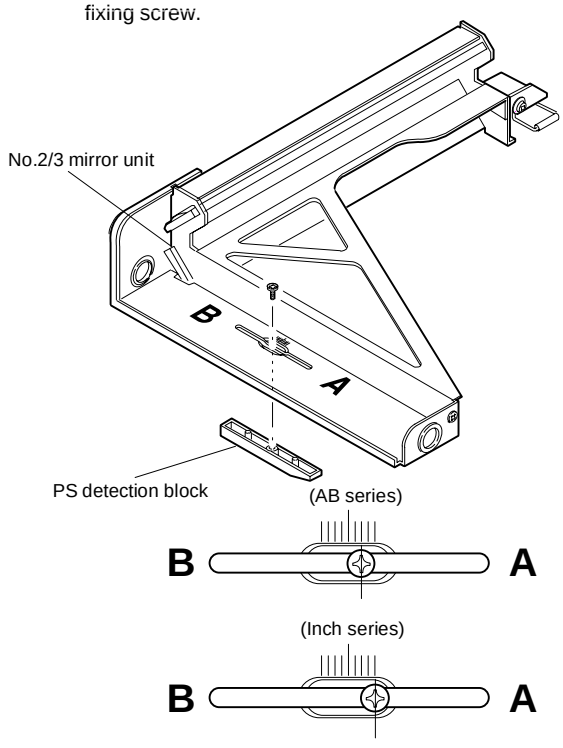
③ Remove the No.4/5 mirror unit shaft adjusting plate, No.2/3 mirror unit shaft, and lens return spring, then remove the No.4/5 mirror unit.



F. PS detection block installation

AB series: Place the second scale in A direction to the center of fixing screw.

Inch series: Place the fourth scale in A direction to the center of the fixing screw.

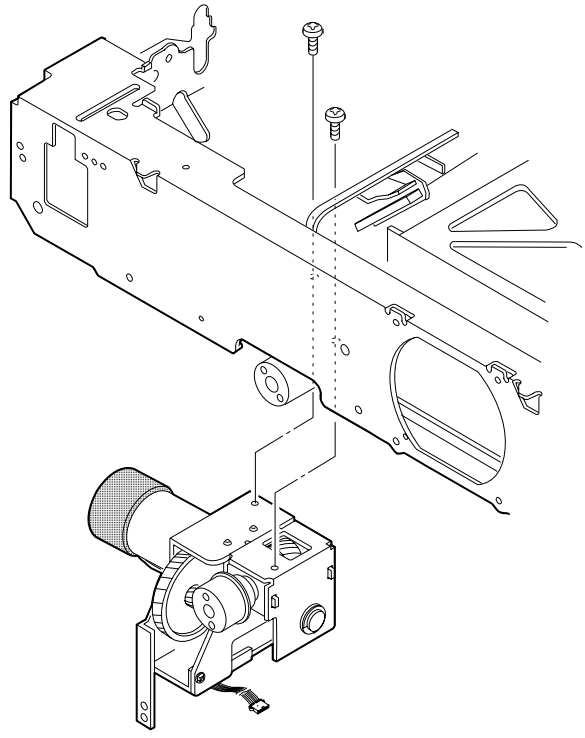


G. Optical mirror motor removal

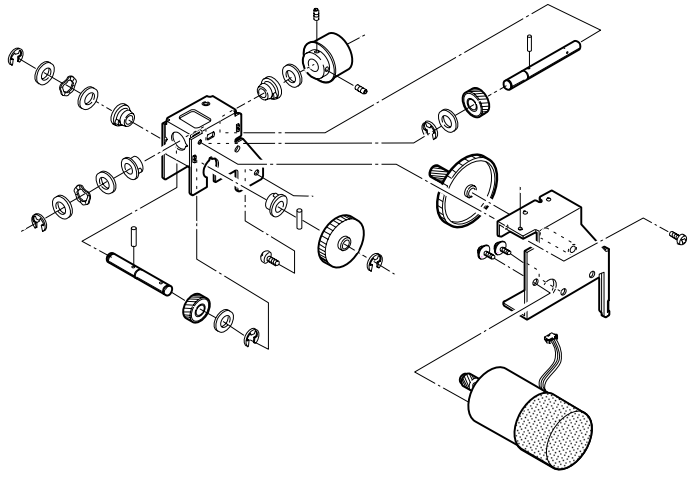
① Remove the original cover, the rear cabinet, and the table glass.

② Remove the mirror base drive wire from the drive pulley.

③ Remove the optical mirror motor unit. (2 screws)



(Scanner motor unit)



5. Adjustment and hints

After replacement or disassembly of any parts in the optical system, check the following items:

A. Exposure adjustment: Exposure balance adjustment by the exposure control plate.

B. Copy lamp brightness adjustment: Adjust the volume control of the CLR PWB.

C. Copy lead edge image position adjustment: Adjust copy lead edge position by original guide L.

D. Resolution adjustment: Adjust the light path length by No. 4/5 mirror unit. Adjust the mounting angle of No. 4/5 unit. Perform fine adjustment of lens mounting.

E. Magnification ratio adjustment: Perform fine adjustment of normal copy ratio at the lens mounting position.

F. Center adjustment: Perform fine adjustment of lens guide mounting position.

G. Distortion adjustment: Adjust tilt by No. 4/5 unit eccentric screw. Adjust distortion with mirror base rail.

A. Exposure control plate (exposure balance adjustment)

When an uneven exposure occurs between the front and rear frame sides, move the location of the exposure control plates to adjust.
Before this adjustment is done, it is mandatory to check the following to be normal.

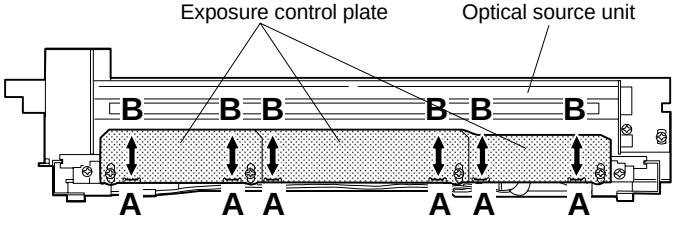
✳ Corona wires

✳ Developing cartridge

✳ Stains in the optical system

① Make a half-tone copy in the normal mode and check the exposure balance.

② Move the exposure control plate in the arrow directions A and B to adjust. Moving it in the direction A makes exposure brighter and moving it in the direction B makes exposure darker.



B. Copy lamp intensity adjustment

1. The copy lamp intensity (copy density) must be adjusted in the following cases:
   ① After replacement of the copy lamp.
   ② After replacement of the copy lamp regulator PWB or its component.
   ③ After replacement of the photosensor (AE sensor)
2. Procedures before copy density adjustment
   - Clean the table glass, the main corona, and the transfer corona.
   - Remove the light source unit from the body, and clean the photosensor surface with cloth immersed in alcohol or water. (Note: Cleaning with dray cloth will charge the sensor surface, attracting dusts onto the surface.)
   - Assemble the light source unit to the body.
   - Check the bias value and adjust if necessary.
   - Clean the original cover.
3. Copy density adjustment procedure
   - Set the test chart.
     Fold an A4 (8-1/2" x 11") paper into two and put it on the original reference position in the front frame side of the original table. Then put the test chart (UKOG-0162FCZZ or KODAK Gray Scale) on the white paper so that the test indication may be copies.

Adjustment procedure

① Set the exposure switch on the operation panel to the center (Auto). Then adjust with VR-201 in the CLR PWB.

C. Copy lead edge image position adjustment

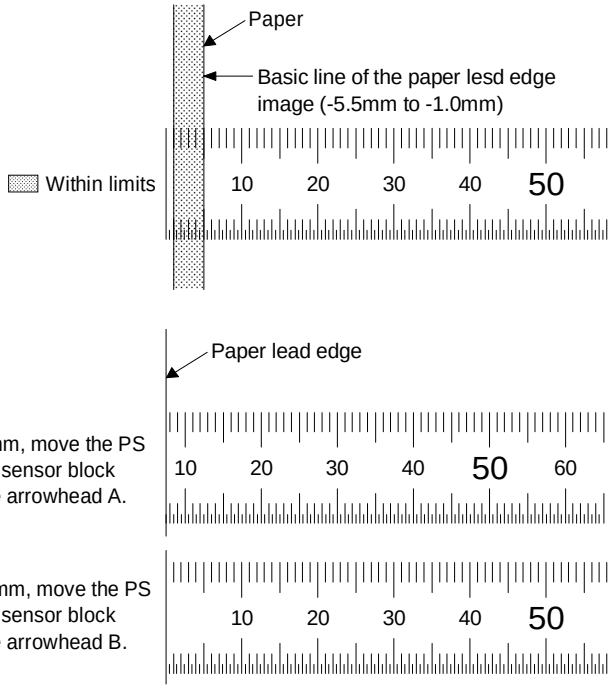
This adjustment is requred in the following case:

- When the copy lead edge image position is outside the specified range (-1.0mm to -5.5mm).

(Procedure)

① Check the lead edge image position.
Place an scale fitting it with the original lead edge guide and make a copy.

② When the lead edge position is less than -5.5mm, move the original guide in the arrow direction A. When it is more than 1.0mm, move the original guide in the arrow direction B.



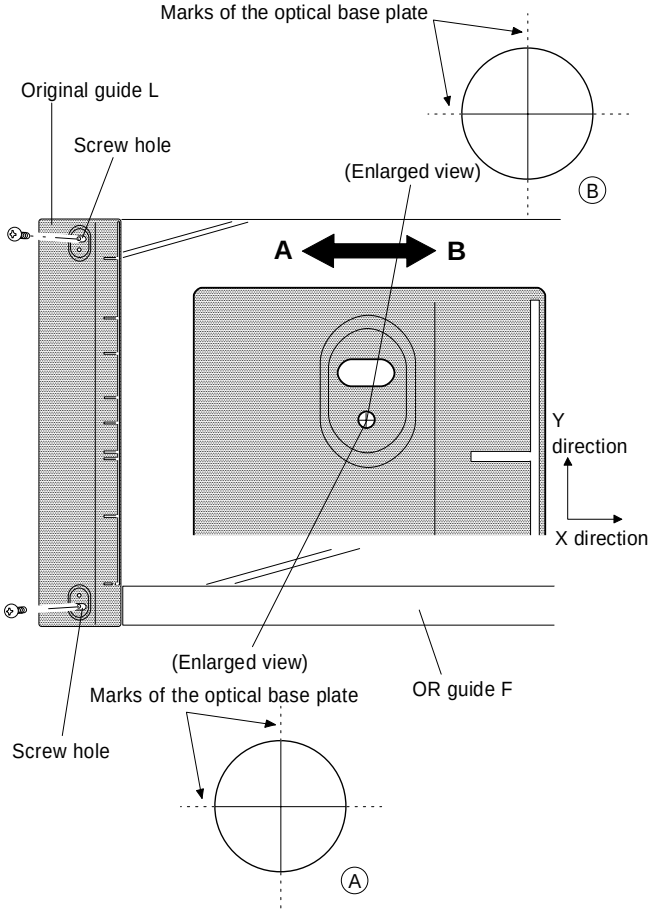
D. Check items for lead edge adjustment and original guide L installation

Adjust with two marks on the optical base plate which can be seen through the smaller hole in the original guide L.

(a) X direction: With the vertical mark as the reference, adjust the position of the original guide L.

(b) Y direction: With the horizontal mark as the reference, adjust the position of the original guide L.

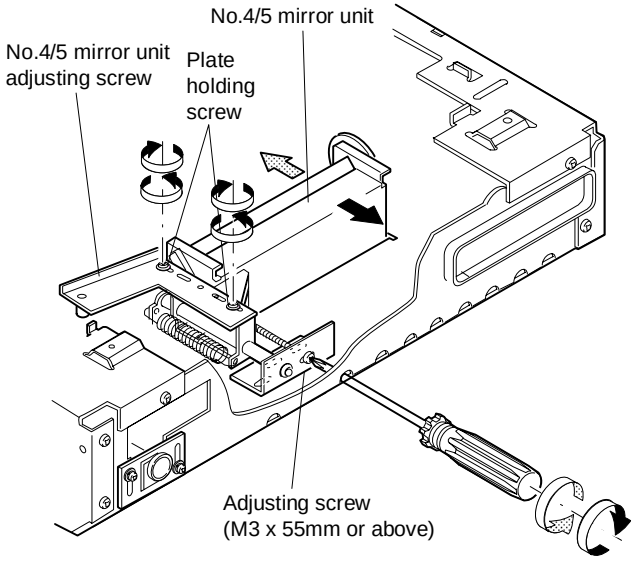
(c) Parallelism: Adjust so that the vertical mark of hole Ⓐ comes to the similar position as that of hole Ⓑ.



E. Resolution adjustment-((1)) (all) Blur on front and rear of copy)

Adjustment procedure

1. Remove the table glass, operation panel, rear panel, and the left panel.
2. Loosen the No.4/5 mirror adjusting plate holding screws (3 x 8P, tite screw, 2pcs.).
3. Tighten the resolution adjusting screw (M3 x 55mm, minimum) to the No.2/3 mirror unit from the optical baseplate side.
4. Install the operation panel, and the table glass, then make a copy. Make adjustment with the adjusting screw while checking the resolution.
5. After completion of the adjustment, apply the No.4/5 mirror unit adjusting plate to the shift cam and tighten it with two screws (3 x 8P, tite).
6. Remove the adjusting screw that used in Step 3 above.



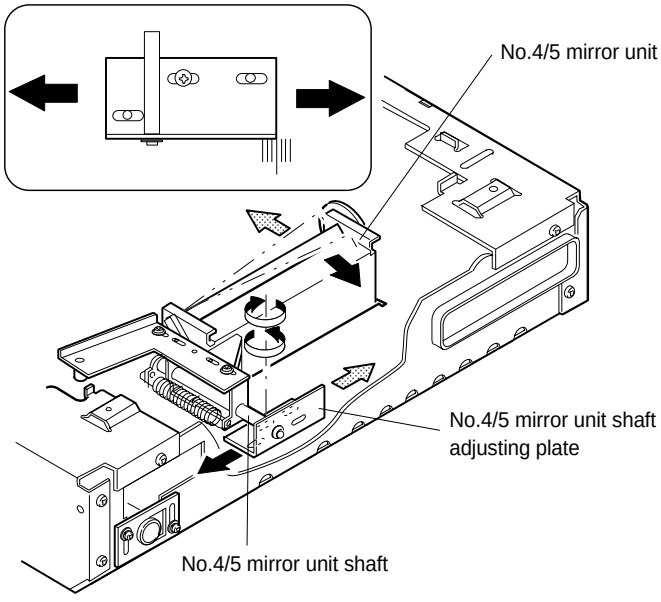
F. Resolution adjustment-((2)) (In case there is a resolution unbalance between the front and rear sides or blur is seen in one side of the copy)

Check and make adjustment in the following way if there is an unbalance between front and rear sides.

- Check item
  Make sure that the protrusion at two locations of the lens hood is firmly fit in the square holes of the lens baseplate.

Adjustment procedure

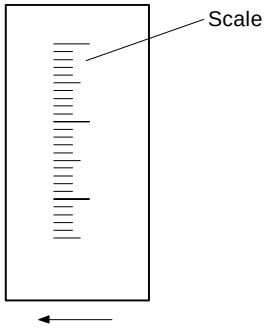
1. With the procedure mentioned in the resolution adjustment-((1)), set the front frame side resolutions equal.
2. Loosen the No.4/5 mirror unit shaft adjusting plate holding screw and move the plate right and left to equalize the resolutions on the rear frame side. (With this, the resolutions on the rear frame side change.)



G. Magnification ratio adjustment

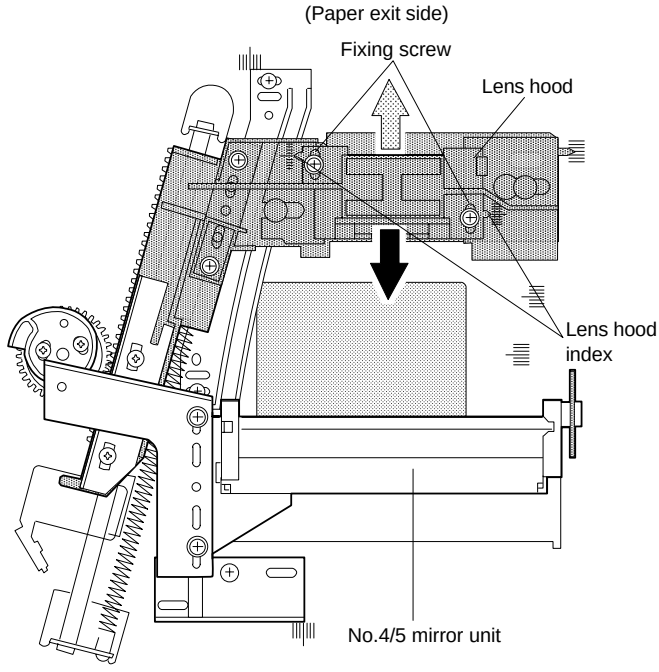
Adjustment procedure

1. Check the magnification ratio after making a copy of the scale in the normal mode.
   Copy size/original size x 100%



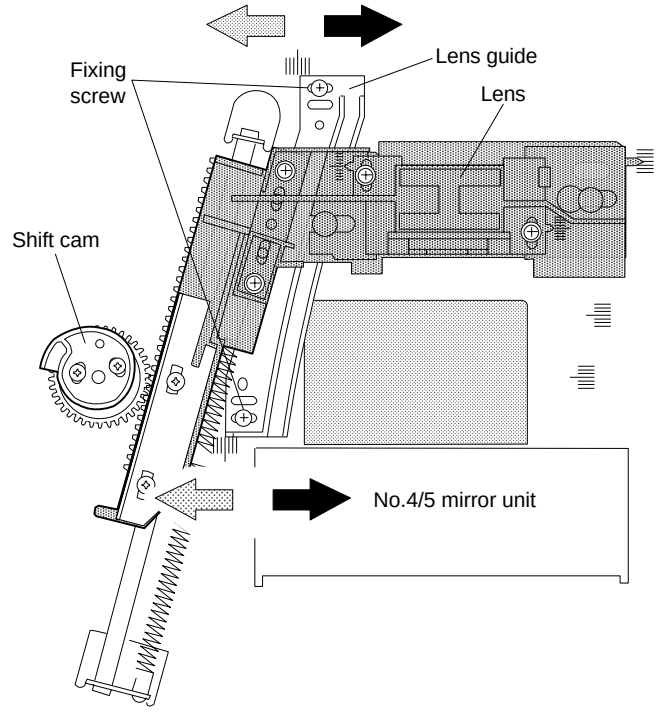
2. If the copy is too large: Shift the lens hood location (lens position) towards the No.4/5 mirrors unit side.
   If the copy is too small: Shift the lens hood location towards the paper exit side.

NOTE: If the copy is 1% larger, shift the index on the lens hook 1.7mm towards the No.4/5 mirrors unit side.



H. Center deviation adjustment

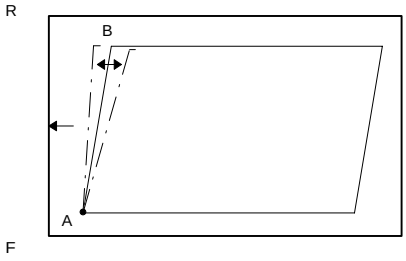
Adjust the lens guide location for image loss between 3 to 9 mm.

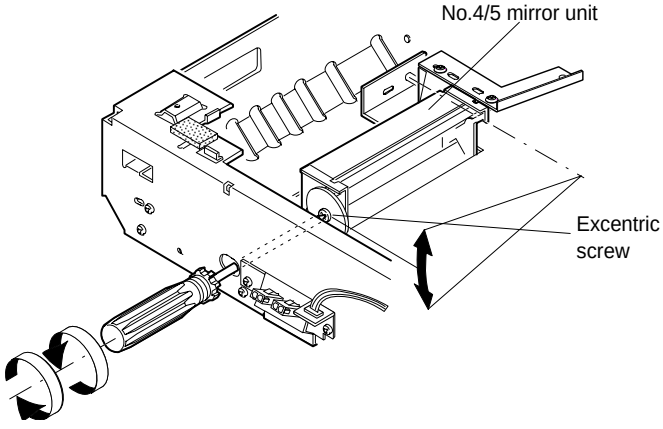


I. Distortion adjustment

Adjustment procedure

1. Remove the operation panel, insert the screwdriver through the cut in the optical baseplate hole, and rotate the eccentric screw to adjust the distortion.
   As the eccentric screw is rotated, the front frame side No.4/5 mirror unit location changes 1mm.



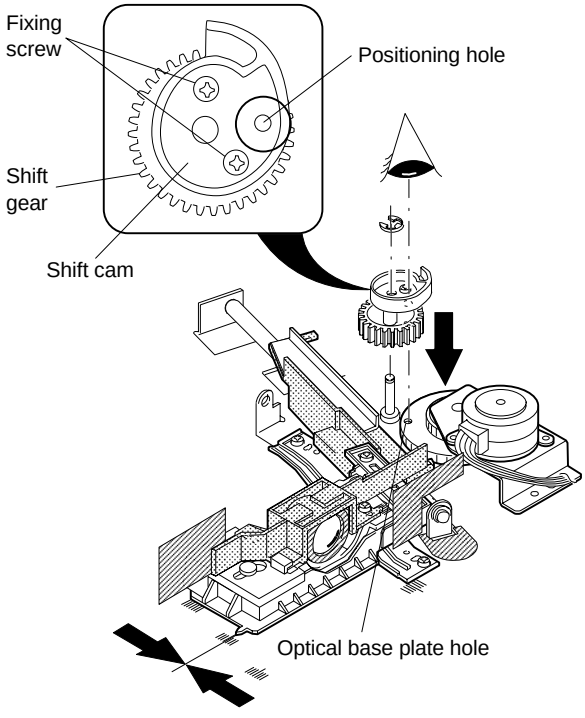


6. Optical system re-assembly hints

A. Installing the shift cam

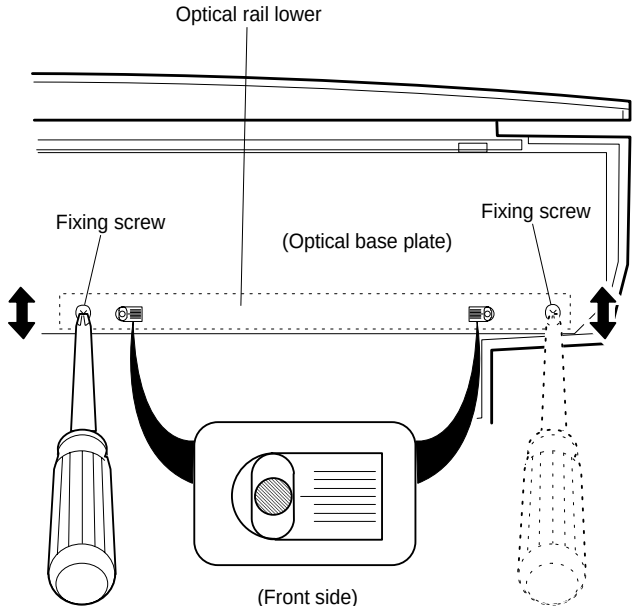
① Fit the shift cam and gear positioning hole to the hole in the baseplate.

(Positioning hole)



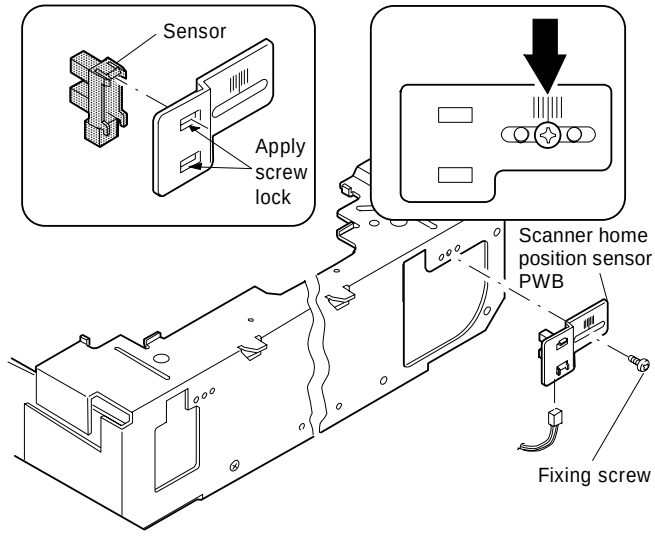
B. Optical rail mounting position

Adjust so that the optical rail can be seen at the center through the optical base plate square hole and fix with a screw.



C. Adjust so that the scanner base home position PWB come to the center of the scale and fix it with screws.

The sensor must be fixed to the PWB with screw lock.



Others

OID shift rate of the lens number vs. normal mode
OID designed value (696.85mm)

19	+5.1~	9	–0.9~–0.3
18	+4.5~+5.1	8	–1.5~–0.9
17	+3.9~+4.5	7	–2.1~–1.5
16	+3.3~+3.9	6	–2.7~–2.1
15	+2.7~+3.3	5	–3.3~–2.7
14	+2.1~+2.7	4	–3.9~–3.3
13	+1.5~+2.1	3	–4.5~–3.9
12	+0.9~+1.5	2	–5.1~–4.5
11	+0.3~+0.9	1	–5.1~
10	–0.3~+0.3		

If 10 is center:

11~19: OID expands: towards the paper exit side from the No.4/5 mirror unit basic location.

9~1: OID shortens: towards the paper feed side from the No.4/5 mirror unit basic location.

D. Mirror base drive wire installation

(1) Fix the start point ① of the mirror base drive wire.

(2) Wind the wire along the groove inside the no. 2 and no. 3 mirror unit pulley. (UP → Down)

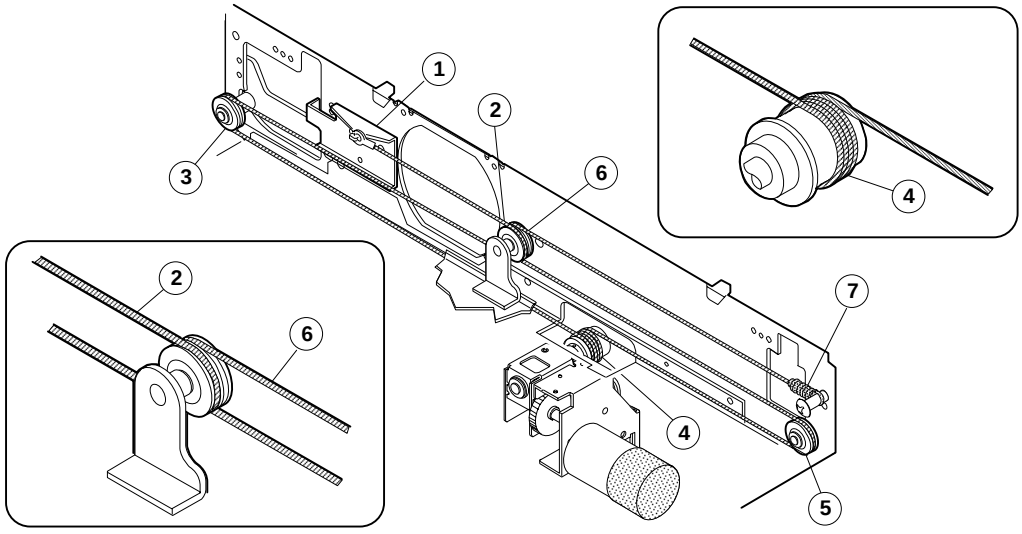
(3) Wind the wire around the rear frame paper exit side pulley. (Up → Down)

(4) Wind the wire 4 turns around the mirror unit drive pulley counter clockwise.

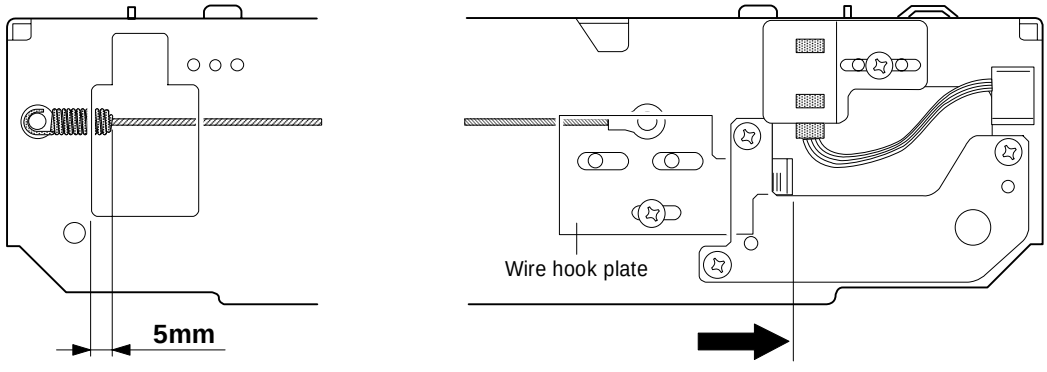
(5) Wind the wire around the rear frame paper feed side pulley. (Down → Up)

(6) Pass the wire over the light source unit wire fixing section, and wind the wire along the groove outside the No. 2 and No. 3 mirror unit pulley. (Down → Up)

(7) Secure the wire end on the wire hook.



(8) Wire tension adjustment
Loosen the wire hook plate fixing screw.
Slide the wire hook plate so that the spring at the wire start point extends 5mm from the body frame notch section.

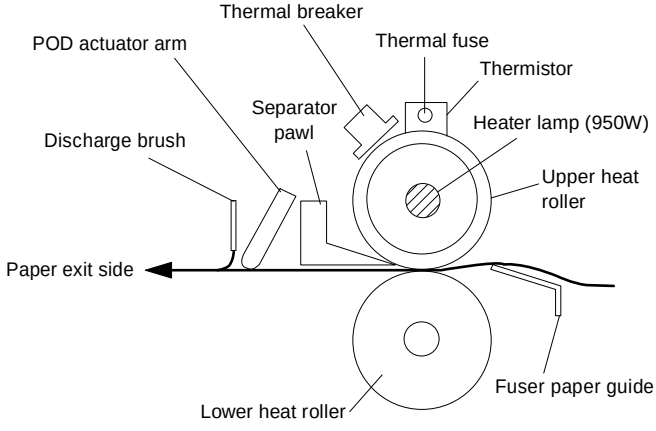


[9] FUSER SECTION

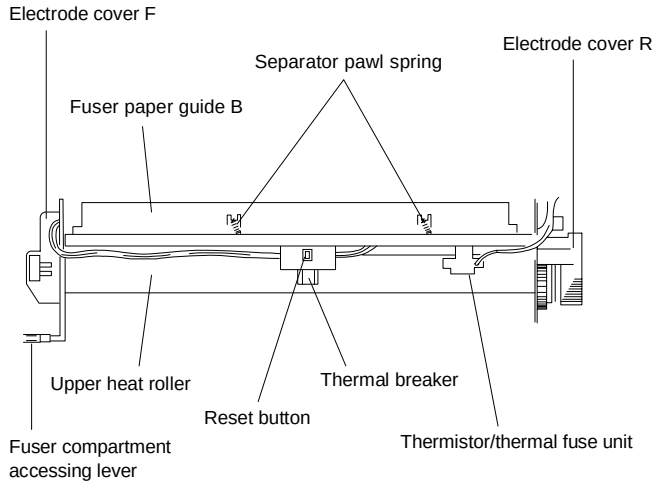
1. General description

The image is fixed permanently on the copy paper by the action of the fuser. Through a combination of heat and pressure, the image is fused into the copy paper. The upper heat roller contains the heater lamp, a 950 watt, halogen lamp. The temperature of the heat roller is detected by the thermistor, which relays this information to the main PWB. When the temperature is low, the main PWB energizes the heater lamp through a solid state switch called a triac. The heater lamp stays on until the proper temperature is reached.
The heater is protected from overheating by a thermal breaker and a thermal fuse. An "H" will appear on the display panel and the copier will stop operation.

General block diagram (cross section)



(Top view)



A. Heat roller

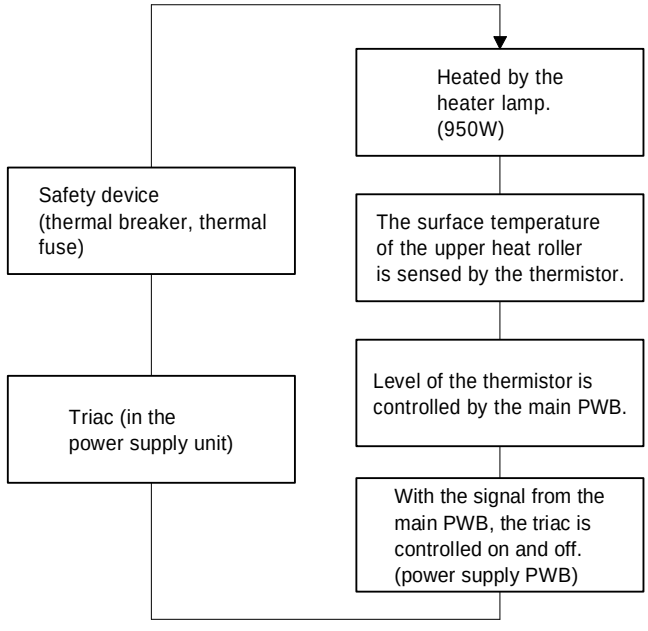
A teflon roller is used for the upper heat roller and a silicone rubber roller is used for the lower heat roller for better toner fusing performance and paper separation.
Simple raising of the fuser compartment accessing lever separates the upper heat roller from the lower heat roller for easier misfed paper removal.

B. Separator pawl

Two separator pawls are used on the upper heat roller. The separator pawl is teflon coated to reduce friction with the roller and prevent a smear on the paper caused by the separator pawl.

C. Thermal control

① The heater lamp, thermistor, main PWB, DC power supply PWB, and triac within the power supply unit are used to control the temperature in the fuser unit.
To prevent abnormally high temperature in the fuser unit, a thermal breaker and thermal fuse are used for safety purposes.


Heated by the heater lamp. (950W)
Safety device (thermal breaker, thermal fuse)
The surface temperature of the upper heat roller is sensed by the thermistor.
Level of the thermistor is controlled by the main PWB.
Triac (in the power supply unit)
With the signal from the main PWB, the triac is controlled on and off. (power supply PWB)

② The surface temperature of the upper heat roller is set to 170°C. The surface temperature during the power save mode is set to 100°C.

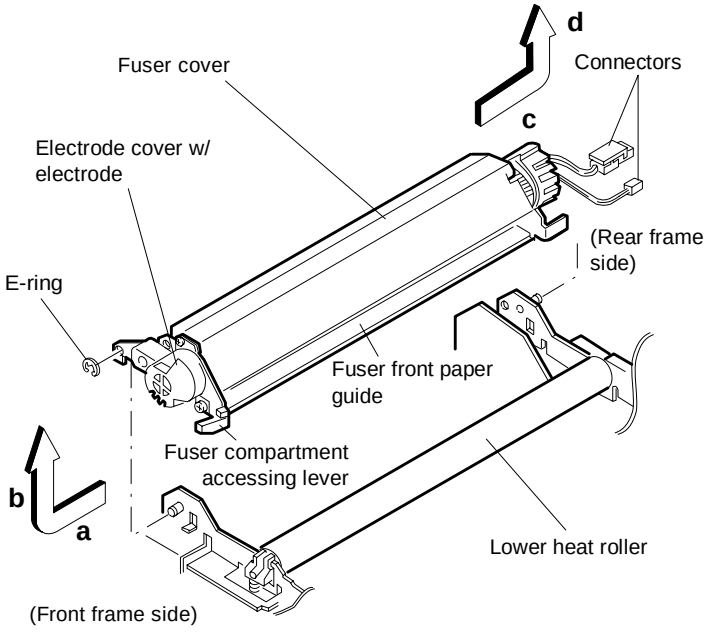
③ The self-check function comes active when one of the following malfunctions occurs, and an "H" is displayed on the multicopy window.
   a. When the heat roller surface temperature rises above 240°C.
   b. When the heat roller surface temperature drops below 100°C during the copy cycle.
   c. Open thermistor
   d. Open thermal fuse
   e. Open thermal breaker contacts (∗)
   (∗) When the thermal breaker contacts are open, they have to be reset using the reset button on the thermal breaker. It does not reset automatically.

2. Major component removal

A. Upper heat roller

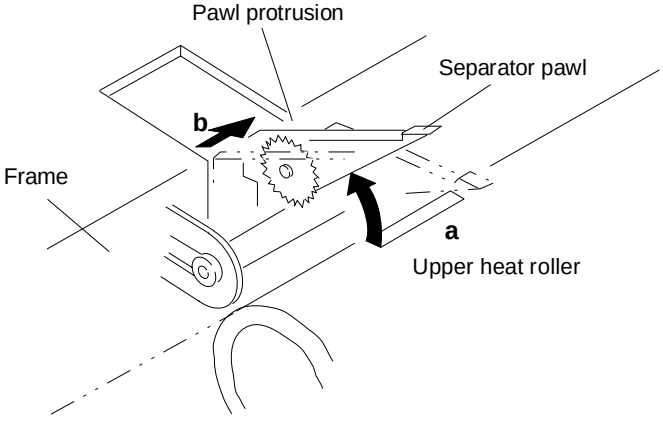
① Open the upper frame.

② Remove the E-ring and disconnect the two connectors. Remove the boss on the front frame, then the one on the rear frame side (arrow marks a thru d).

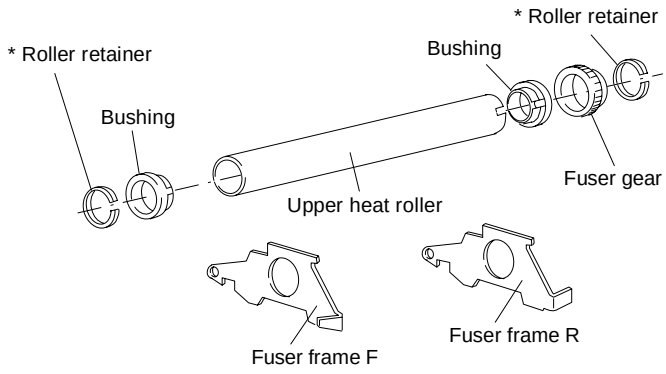


③ Remove the fuser cover, electrode covers F and R, and the heater lamp.

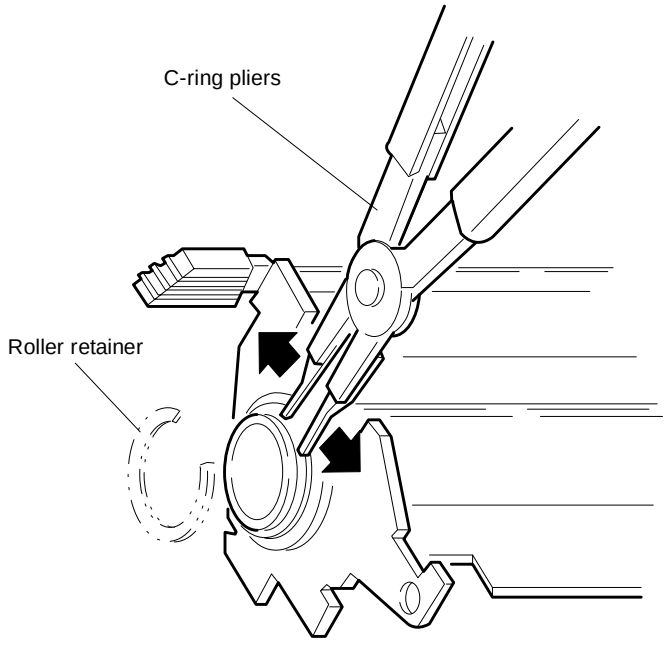
④ To remove the separator pawl from the upper heat roller, hook the protrusion of the separator pawl on the frame, arrow a and b.



⑤ Remove the roller retainer, gear, bushing, and the upper heat roller.

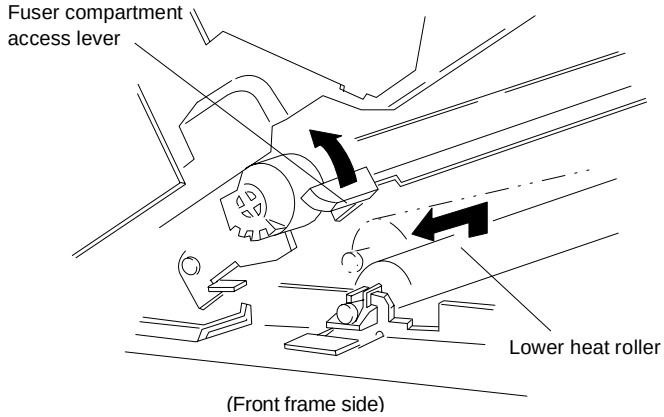


∗ Use C-ring pliers to remove the roller retainer.



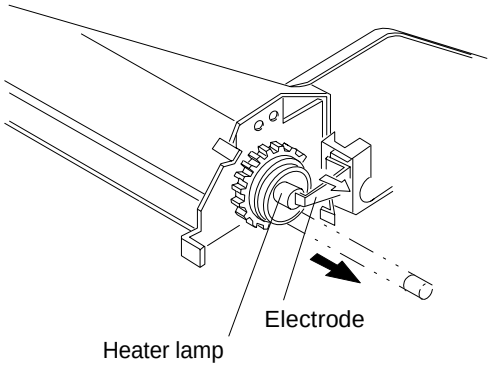
B. Lower heat roller

① Open the upper frame and lift up the fuser compartment access lever. Lift the lower heat roller up to remove it.



C. Heater lamp

① Remove the heater lamp from the electrode, then carefully slide out the lamp.

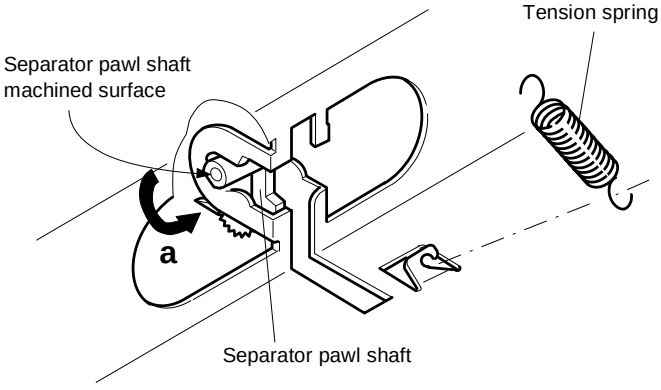


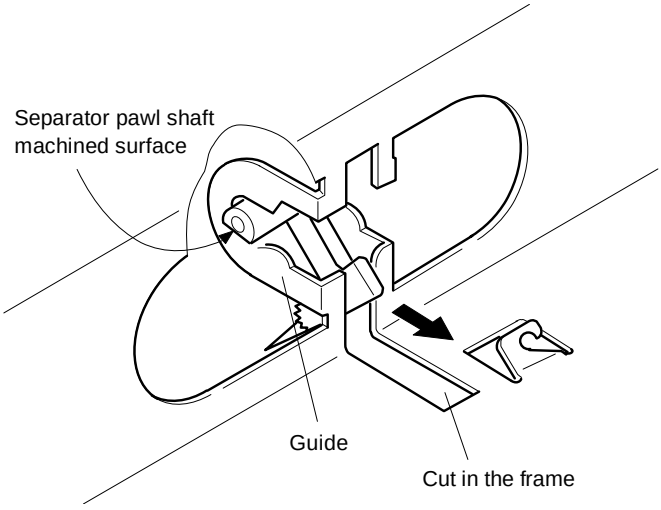
D. Separator pawl

① Remove the upper fuser unit.

② Remove the fuser cover.

③ Remove the tension spring. Rotate the pawl in direction A and match the machined surface of the separator pawl shaft to the guide, then remove it from the notch.



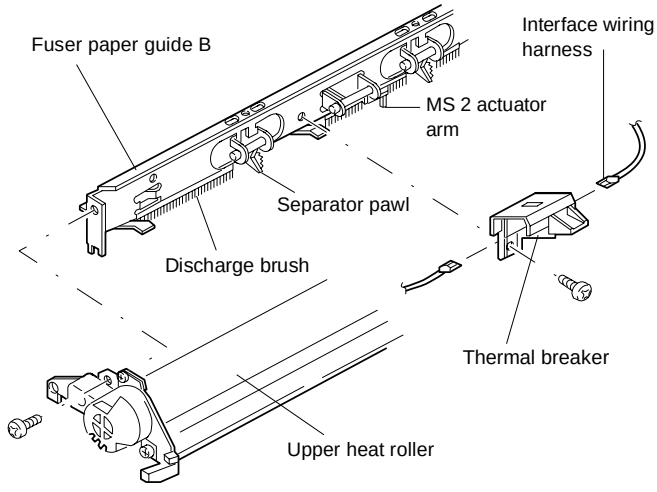


E. Thermal breaker, thermistor (thermal fuse) unit

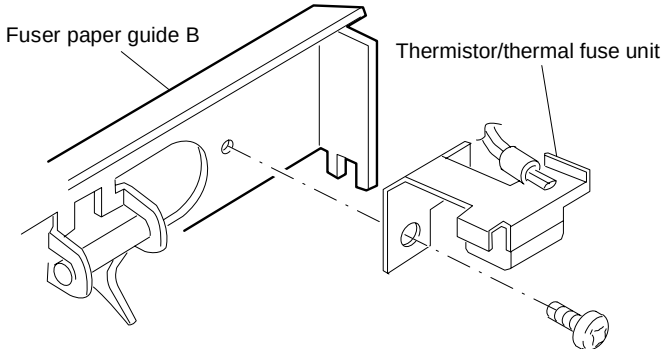
① Remove the upper fuser unit, and the fuser cover.

② Remove the fuser paper guide B.

③ Remove the screws and the heater lamp interface wiring harness then remove the thermal breaker.



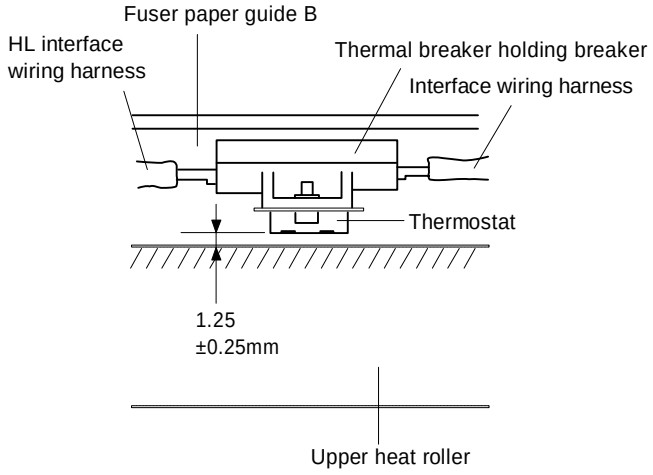
④ Remove the screw on the terminal board side and remove the thermistor/thermal fuse unit.



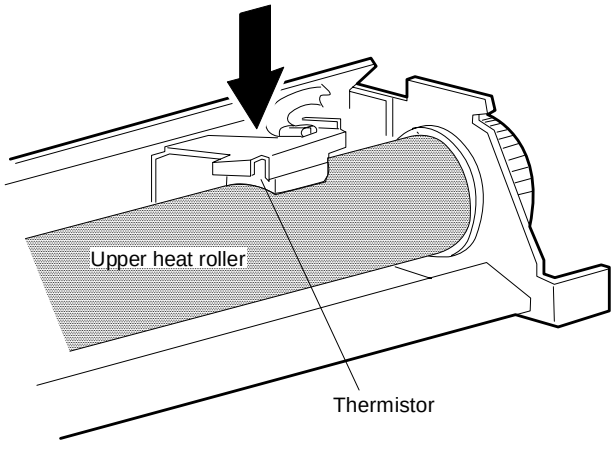
NOTE: Check items after the installation

- Thermal breaker
  Check to see that the gap between the thermal breaker and the heat roller is 1.25 ± 0.25mm when the pressure is released (✳).

✳ Note
A pressure is applied to the roller when the following two conditions are satisfied. Be sure to release the pressure before check.
1. The upper frame is closed.
2. The paper exit tray is put down.



- Thermistor
  Make sure that the center of the thermistor is in contact with the heat roller.



[10] Others

1. Cabinet removal

A. Cabinet

(1) Lift and remove original cover ①.

(2) Remove original cover guide L ② and table glass ③.

(3) Remove front cabinet ④.

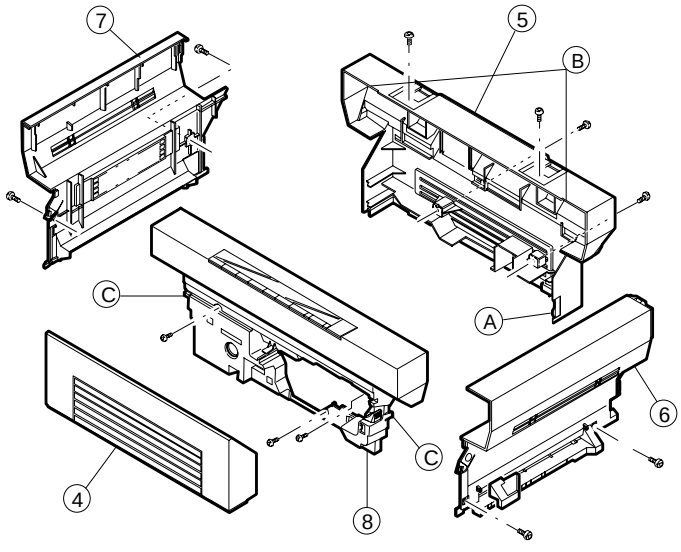
(4) Open the upper frame unit.

(5) Remove the four screws which are fixing rear cabinet ⑤. Disengage pawl Ⓐ and the projection in right cabinet ⑥. Disengage two pawls Ⓑ, and remove rear cabinet ⑤ from the body.

(6) Remove the two screws of right cabinet ⑥ and the two screws of left cabinet ⑦, and remove the right and the left cabinets from the body.

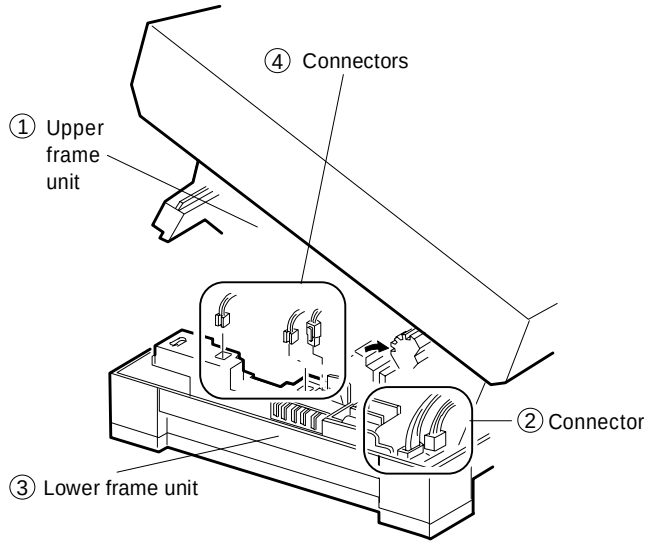
(7) Remove the three screws which are fixing operation cabinet ⑧, disengage pawls Ⓒ in the both sides, and remove operation cabinet ⑧.

(8) Remove two connectors of the operation panel.



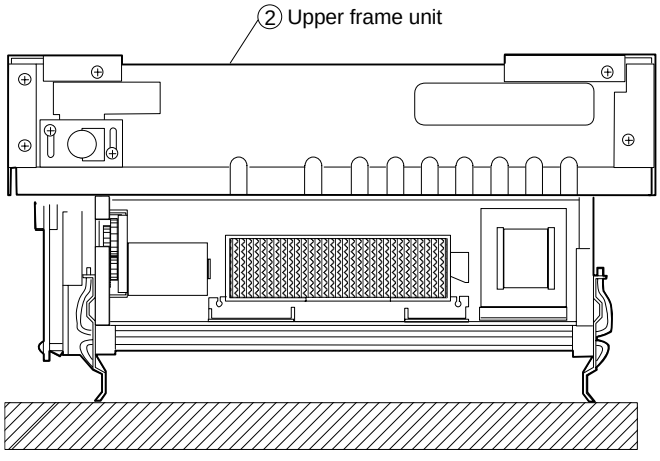
2. Power unit removal

(1) Open the front cabinet.
(2) Push the open button, and lift upper frame unit ①.
(3) Remove the rear cabinet. (Refer to [10]-1, Cabinet removal.)
(4) Disconnect two connectors ② from upper frame unit ①. (Refer to Fig. 3)
(5) Remove four screws in torsion bar sections.
(6) Seperate upper frame unit ① from lower frame unit ③.
(7) Remove transfer corona unit . (Refer to [10]-3, Transfer corona removal.)
(8) Remove three connectors ④ from the paper feed solenoid and the fusing section. (Refer to Fig. 1)



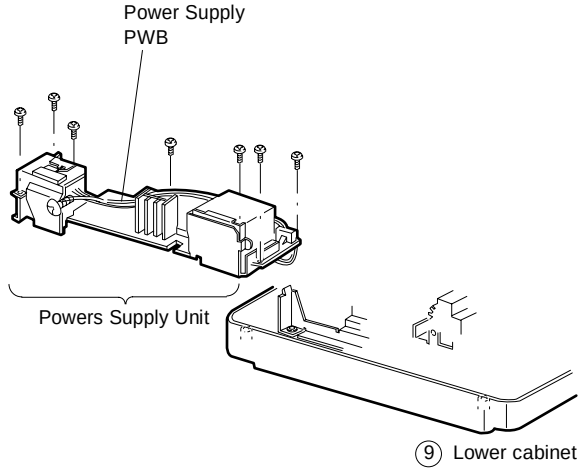
(Fig. 1)

The upper frame unit can be removed. The upper frame unit can be placed on a level surface because the lower portions of the left cabinet and the torsion bars provide enough space to protect the drum.



(Fig. 2)

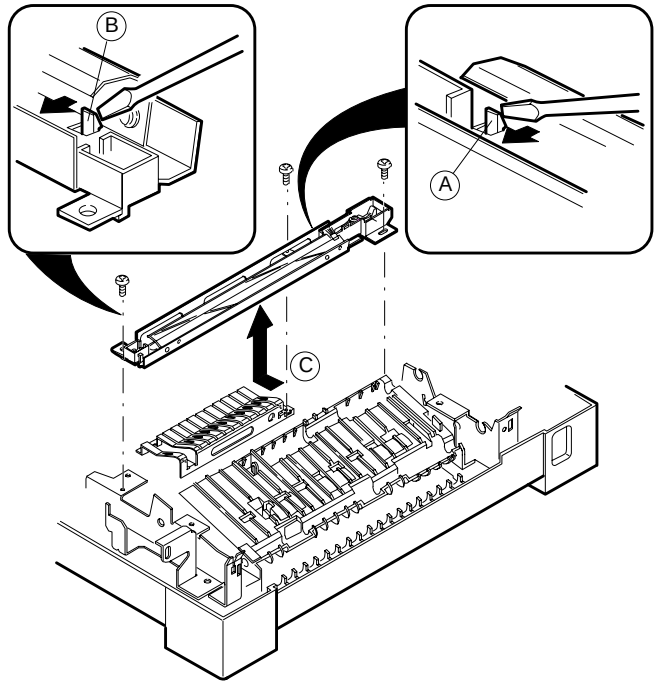
(9) Remove the tapping screws which are fixing the power unit to lower cabinet ⑨.
Remove tap tight screws which are fixing the power unit to the frame chassis, and remove the power unit.
(There is no need to remove the paper feed solenoid.)



(Fig. 3)

3. Transfer corona removal

(1) Remove the upper frame unit. (Refer to [10]-2, Power unit removal.)
(2) Remove the three screws.
(3) Push pawl Ⓐ with a screwdriver (–) and lift the unit.
(4) Push pawl Ⓑ with a screwdriver (–) and lift the unit.



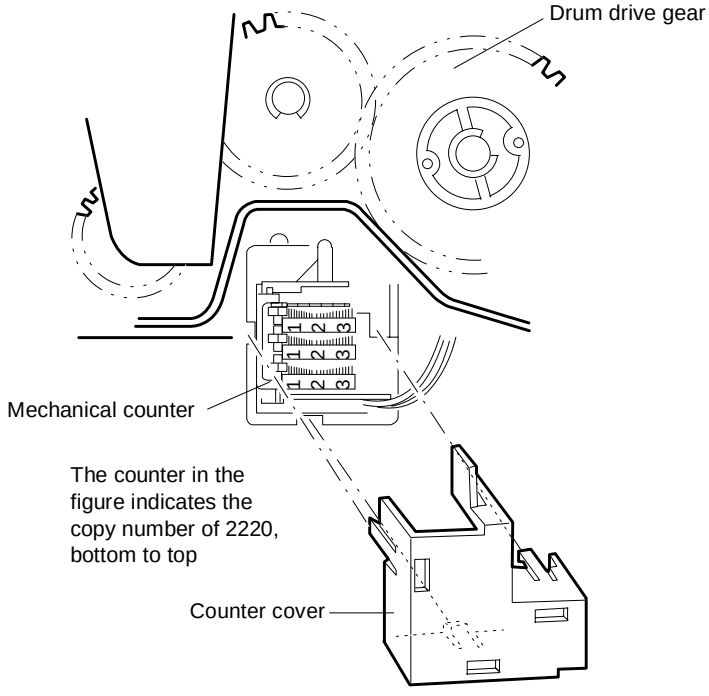
(5) Slide the transfer corona toward paper exit side (arrow Ⓒ) and remove it.

✳ Be careful not to touch and damage the corona wire.

When the transfer corona unit screw is removed and the unit is disassembled or parts are replaced, adjust dimension Ⓐ.

4. Drum counter

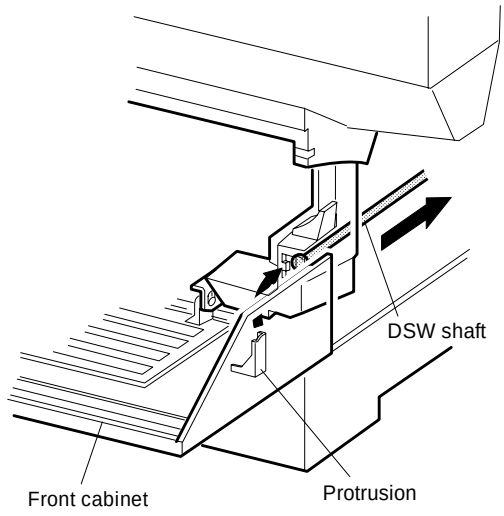
Copy number can be checked on the mechanical counter under the drum drive gear.


Drum drive gear
Mechanical counter
The counter in the figure indicates the copy number of 2220, bottom to top
Counter cover

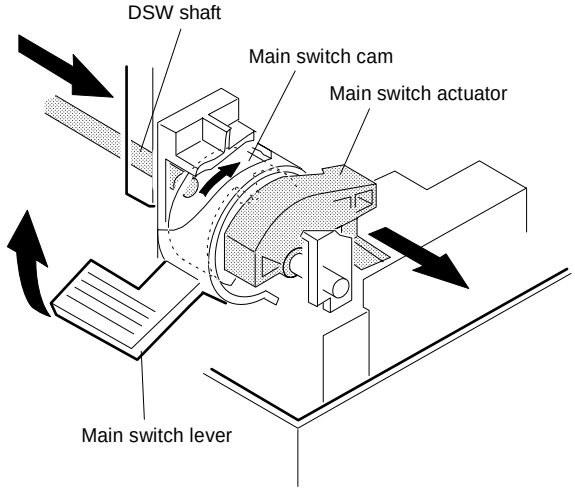
5. Main switch mechanism and precautions

The main power supply can be turned on and off with the POWER switch lever or opening and closing the front cover.

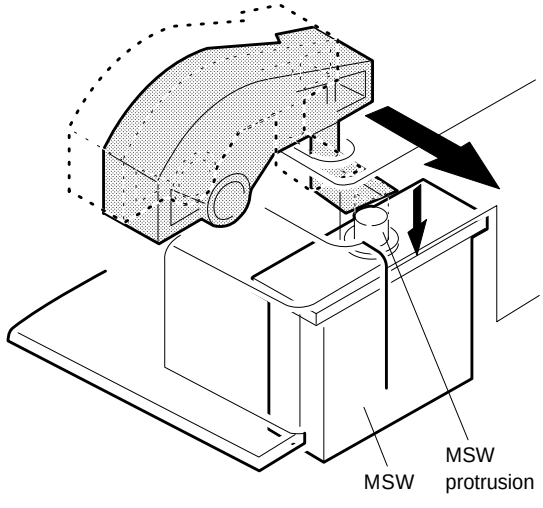
- When the front cabinet is closed, the doorswitch shaft is pushed by the protrusion on the front cabinet which actuates the actuator.



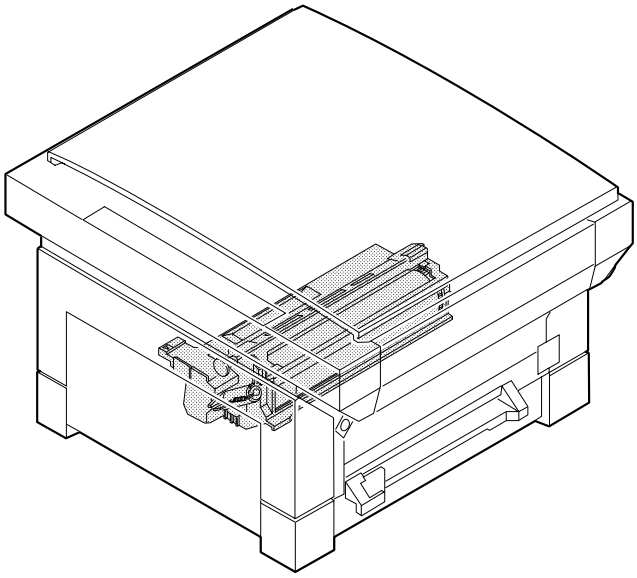
- When the main switch lever is pushed up, the raising part of the cam rides over the actuator. When the front cabinet is closed, the actuator slides towards the rear frame side.



- The slide plate presses down the main switch protrusion to turn on the power.



7. Drum cartridge



General description:

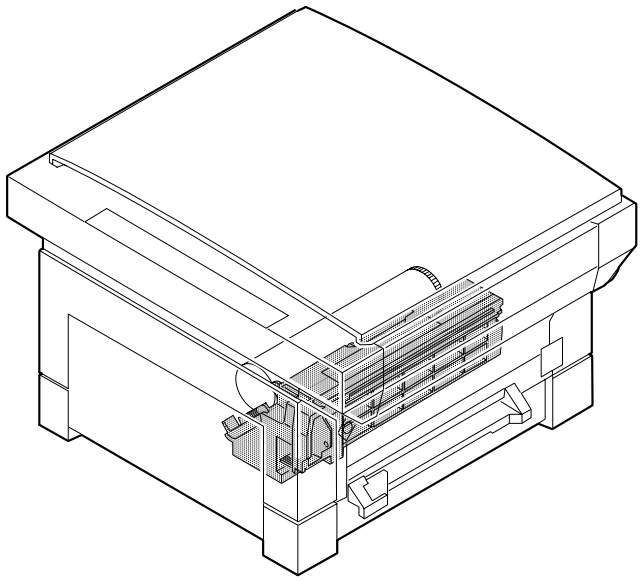
The drum cartridge consists of an OPC drum, main corona, remover tape, cleaning blade, and auger roller. A small tab on the rear frame side of the cartridge is used for resetting the mechanical drum counter. This is a one-time only action and will not reset the counter again though the drum cartridge is removed and reinserted.

Inside the drum cartridge the cleaner blade is always in contact with the drum. During the copy process the residual toner is removed from the drum surface by the blade. The auger roller transports the used toner to the toner collection container located on the front of the TD cartridge.

The remover tape located on the rear frame side of the drum cartridge mechanically strips the paper from the drum and guides it to the separation roller. Due to the copy paper not contacting the drum in this area there is a void of less than 9 mm along the rear frame side of the copy.

NOTE: The drum cartridge is set to factory specifications and is not adjustable in the field. If a problem is suspected replace the entire cartridge.

8. TD cartridge



General description:

The TD cartridge applies toner to the electrostatically charged areas of the drum, and develops the latent image on the drum. The magnetic roller is a rotating aluminum sleeve. At the center of the MG roller are stationary magnets. These magnets hold and direct the developer. The developer is composed of very fine magnetic filings and is used to transport the Toner from the developer to the drum.

As the MG roller rotates, it carries Developer and Toner. The magnetic field around the MG roller forms the Developer into a "Magnetic Brush". The height of the magnetic brush is determined by the doctor blade. The angle of the brush is determined by the position of the magnets in the MG roller.

The auger roller keeps the mixture of Toner and Developer agitated and uniformly mixed. Since the developer is used as a carrier of toner, the developer is not used up, and the volume of developer remains constant. As the toner is pulled out of the developer, the ratio of toner to developer decreases. The toner sensor measures this ratio, and feed back this information to the main PWB which will energize the toner motor (TM) when additional toner is required. The toner motor is mounted on the rear frame of the copier.

The toner sensor and bias connect to the main PWB by a four pin connector located on the rear side of the unit.

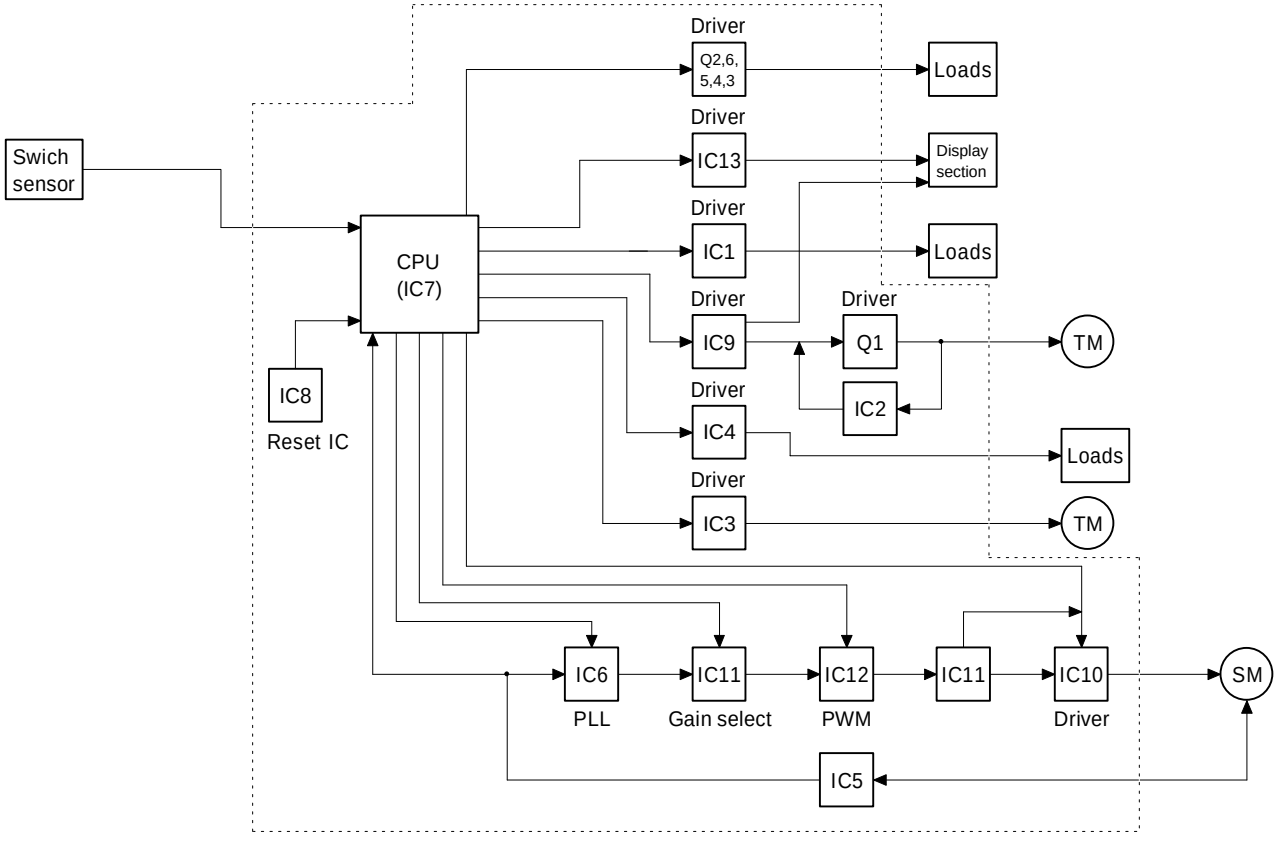
The bias voltage is used to prevent background by applying a counter balancing charge to the developer.

NOTE: The TD cartridge is set to factory specifications and is not adjustable in the field. If a problem is suspected replace the entire cartridge.

[11] ELECTRICAL SECTION

1. Block diagram

2. Main PWB block diagram



CPU IC7 Signal Table

Pin	In/Out	Signal name	Content
1	O	MMPWM	Main motor PWM drive signal
2	O	$\overline{\text{SME}}$	Scanner motor enable signal
3	O	SMCLK	Scanner motor clock signal
4	O	MDL0	Panel matrix select signal
5		MDL1	
6		MDL2	
7		MDL3	
8		MDL4	
9	—	Vss	GND
10	O	PFS	Cassette paper feed solenoid control signal, ON at H (+5V)
11	O	MPFS	Manual paper feed solenoid control signal, ON at H (+5V)
12	O	CFM1	Optical cooling fan motor control signal
13	O	EXN	Exposure density select signal
14	O	TM0	Toner motor drive signal
15	O	TM1	
16	—	—	Not used.
17	O	EXD	Exposure density select signal
18	O	A	Display segment signal
19		B	
20		C	
21		D	
22		E	
23		F	
24	—	Vss	GND
25	O	G	Display segment signal
26	O	H	BL drive signal
27	O	$\overline{\text{SMFC}}$	Scanner motor forward signal
28	O	$\overline{\text{SMRC}}$	Scanner motor reverse signal
29	O	SMGS0	Scanner motor gain select signal
30	O	SMGS1	
31	O	LM0	Lens motor drive signal
32		LM1	
33		LM2	
34		LM3	
35	I	$\overline{\text{RESET}}$	Reset signal, Reset at L (GND)
36	I	MMENC	Main motor encoder signal
37	I	LHPS	Lens home position signal
38	I	SHPS	Scanner home position signal
39	I	SMENC	Scanner motor encoder signal
40	—	V_{DD}	+5V
41	I	X2	Crystal connection section
42	I	X1	
43	—	—	GND
44	—	—	Not used
45	I	CS	Sensor input section
46	—	AV_{SS}	GND for analog port
47	I	RTH	Fuser thermistor signal
48	I	TCS	Toner concentration sensor signal
49	I	PPD	Paper entry sense signal
50	—	—	GND
51	—	—	

Pin	In/Out	Signal name	Content
52	—	—	Not used
53	—	—	Not used
54	O	PR	Power relay control signal, ON at H (+5V)
55	—	AV_{DD}	+5V for analog port
56	—	AV_{REF}	
57	O	HL	Heater lamp control signal
58	O	CFM2	Fuser cooling fan control signal
59	O	DL	Discharge lamp control signal
60	O	CLR	Copy lamp control signal
61	O	THV	Transfer corona control signal, ON at H (+5V)
62	O	MHV	Main corona control signal, ON at H (+5V)
63	I	KI1	Key input section
64	I	KI0	

• Sensor input matrix (Connected to 45 pin)

Select signal	Signal name	Description
A	CS2	Drum counter switch
B	CS1	
D	POD	Paper out sense signal

• Density select signal table

	Light	Normal	Dark
EXN	L	H	L
EXD	L	L	H

• Drum counter

	Z-87/85Ⅲ
CS1	8K
CS2	9K

- Alarm display at CSW1 ON.
  The machine stops at CSW2 ON.

[12] Circuit diagram and Time chart

AC POWER SUPPLY CIRCUIT (100V) 43
DC POWER SUPPLY CIRCUIT (100V) 44
POWER SUPPLY P.W.B. 45
MAIN CIRCUIT 1 46
MAIN CIRCUIT 2 47
MAIN P.W.B. 48
CLR P.W.B. 50
BL CIRCUIT 51
OPERATION CIRCUIT 52
TIME CHART 1 53
TIME CHART 2 54

[13] Actural wiring chart 55

[14] IC specification 56

PWB location

①	Main PWB
②	High voltage PWB
③	Power supply PWB
④	CLR PWB
⑤	Operation PWB
⑥	BL PWB

AC POWER SUPPLY CIRCUIT (100V system)

DC POWER SUPPLY CIRCUIT (120V system)

POWER SUPPLY P.W.B.

100V (100V system)

MAIN CIRCUIT 1

MAIN CIRCUIT 2

MAIN P.W.B.

TOP VIEW

BOTTOM VIEW

CLR CIRCUIT

CLR HIC201 INTERNAL CIRCUIT

CLR P.W.B.

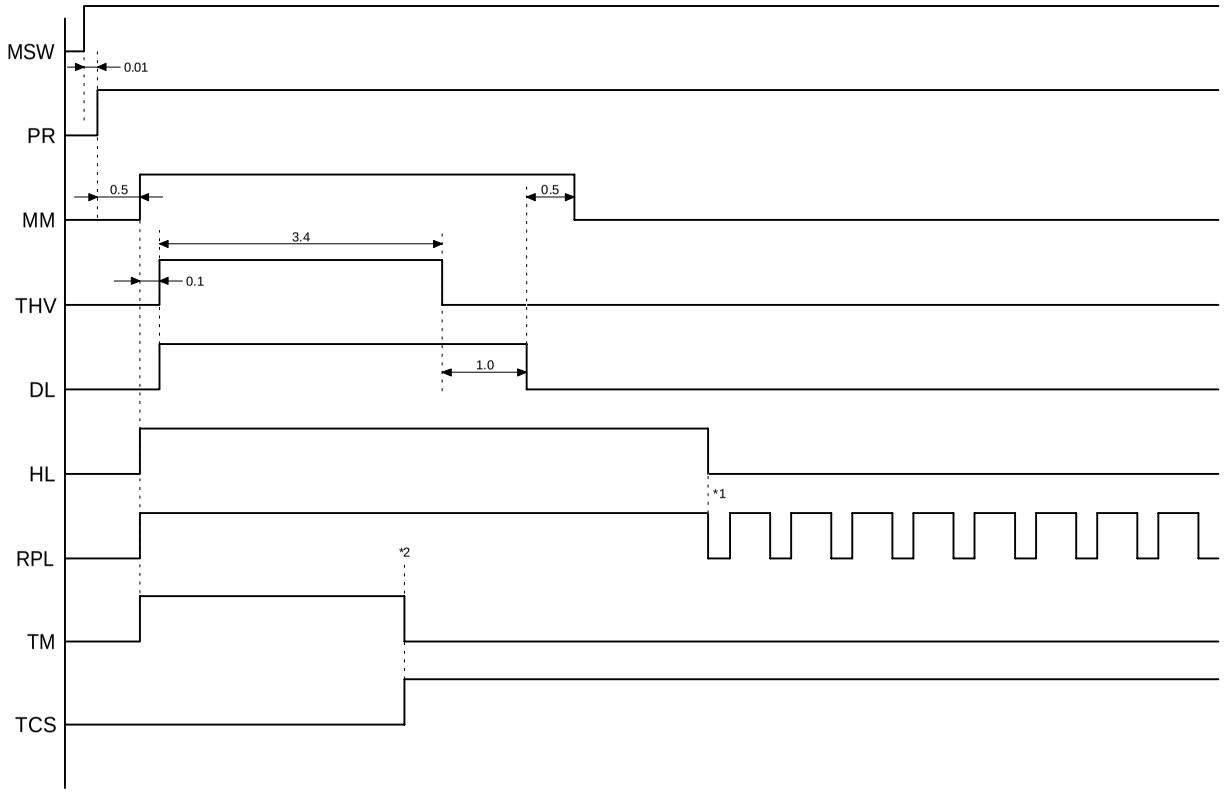
BL CIRCUIT

OPERATION P.W.B.

OPERATION CIRCUIT

TIME CHART1

TIME CHART 2

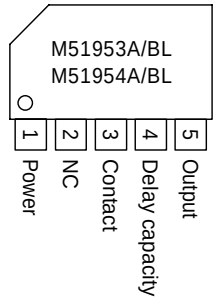


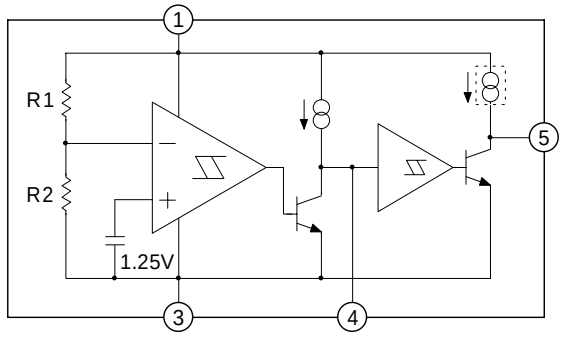
*2: TCS judgment is started when the main motor is turned on.
When TCS level is low, the toner motor rotates for max, 2nd.
The main motor is turned off after 0.5sec from when DL turns off
time chart 2.
*1: Paper feed cycle time
Normal copy: 6sec
Reduction copy: 6.5sec
Enlargement copy: 7.5sec

[13] Actural wiring chart

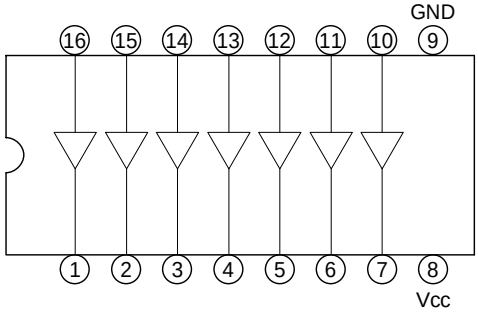
[14] IC specification

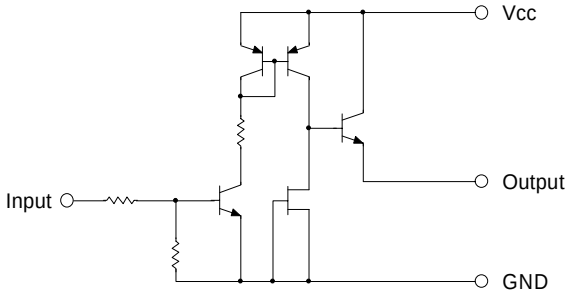
M51953BL



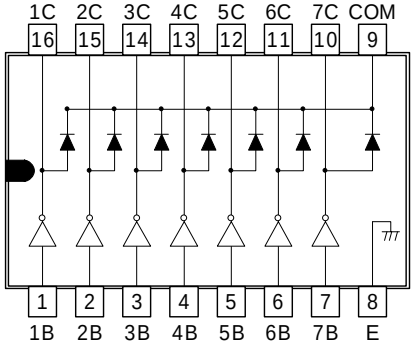


IR2C07

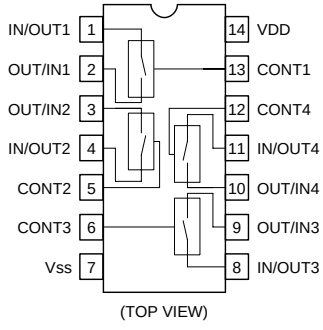




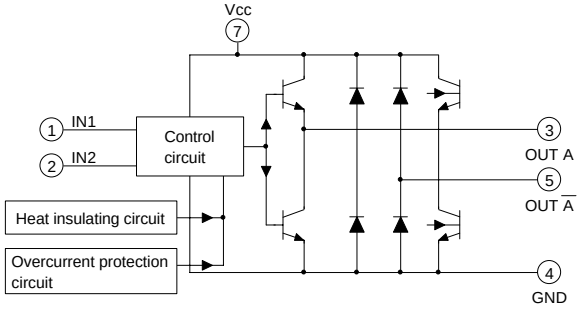
ULN2003AN



TC4066P

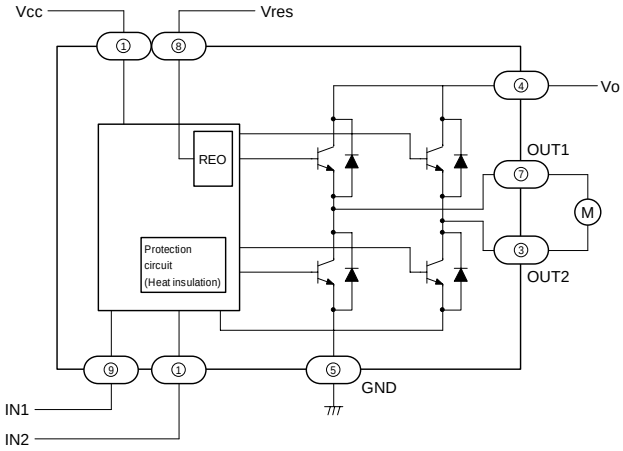


TA8428K



Input		Output		Output mode
IN1	IN2	OUT A	OUT Ā	
H	H	L	L	Brake
L	H	L	H	Reverse
H	L	H	L	Normal
L	L	OFF (High impedance)		Stop

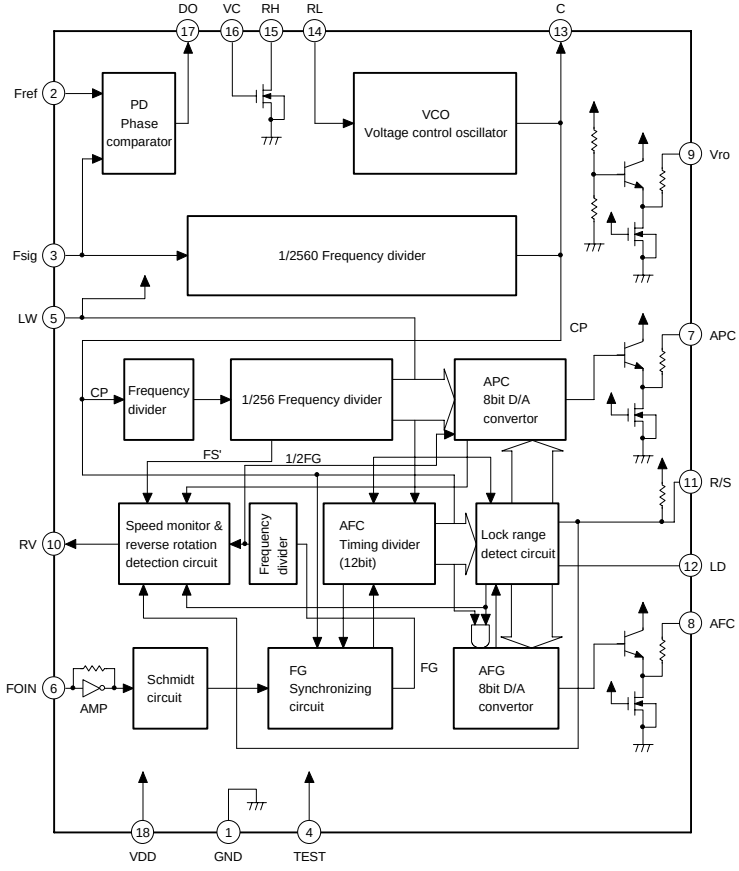
TA7291S



INPUT		OUTPUT		MODE
IN1	IN2	OUT1	OUT2	
0	0	∞	∞	Stop
1	0	H	L	CE/CCW
0	1	L	H	CCW/CW
1	1	L	L	Brake

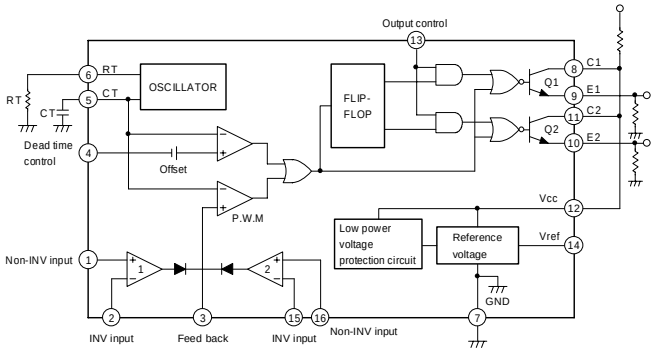
∞ : High impedance
Note: Input is "H" active

TC9192P



Block diagram

TA76494P



Operation waveform